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THE JOURNAL
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Original Communications

CONFLICTING FACTORS IN THE USE OF FLASKING PLASTERS AND DENTURE RUBBERS

By EDWIN H. MAUK, D.D.S., San Francisco, California

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

TO THE dentist seeking to improve his artificial denture work, or to the student learning its fundamentals, it must be evident in reading or by personal observation that the development of the art of denture making in recent years has put this branch of dental prosthesis on a sound basis, founded on the selection of some definite technic and evolved for the purpose of producing definite results. This is in strong contrast to the former guesswork in making dentures and the attendant uncertainty of success, even when the conditions were most favorable.

At the present time a fairly high degree of certainty of success may be justly expected as the end result in the use of any one of several good methods of procedure now in use. Thanks to the efforts of a comparatively small group of devoted and persistent men and the fact that they have freely shared the fruits of their hard work, artificial dentures nowadays *can* be made to rival the natural in appearance, and to approach them at least, in efficiency. No longer should there be any real excuse for the colloquial term "store teeth" with all that it implies of falseness, cheapness and inefficiency.

This is largely a matter of improved appliances and teeth, as well as the intelligent application of principles. Those who remember the crude apparatus and teeth of fifteen or twenty years ago well know the present day advantages of improved equipment and no doubt realize it more forcibly than the young practitioner who has all the modern facilities at his command.

In those days the old "plain line" articulator was almost universally used, for even though at that time consider-

able improvements had been made in these instruments, their merits and advantages were either not understood or were doubted by many. Likewise, posterior teeth of rudimentary or conventionalized form and size were the best available, and continued in use long after their deficiencies were recognized, because the manufacturers would produce nothing better. "No demand" they said.

As for principles, each man had to discover them for himself, after repeated failures, or he continued to have the failures. No wonder that the popular conception of artificial dentures came to be embodied in the term "false teeth", and that their cheapness was the chief consideration to recommend them in the public mind, two tendencies we still have to struggle with in creating an appreciation of the service it is now possible to obtain from good artificial substitutes for the natural teeth.

To-day however, with a comprehensive basis of diagnosis and technic, and highly improved materials, only the man who has the "quantity production" idea needs to plead that the possibilities of denture making are unworthy of his highest skill, either in results to the patient, or in his own financial reward if he can only "deliver the goods." All the necessary factors to produce such results are readily available either by reading and study, or in teaching courses, save only one, that is, judgment. That can come only as a result of experience on the part of the prosthetist, and depends greatly on his aptness for the work. No amount of money can buy it and no mere study or elaboration of methods can confer it. This is especially true of all the art features grouped under the head of esthetics, which is without doubt, the most difficult phase of denture work.

Other elements of success, in so far as they are embodied in material things such as instruments, laboratory appliances and teeth are also readily available to the ambitious prosthetist. It is true, however, as recent studies of men prominent in this work have shown, that there is still great need of improvement in the forms and in the coloring of teeth, if the highest degree of masticating efficiency and the greatest art possibilities are to be achieved. It is evident also that the intricate physical and chemical processes involved in denture making demand a better and more general knowledge of their importance than is usual on the part of those engaged in the laboratory procedures, either in the dentist's office or in the commercial laboratory. Otherwise all the skill and care lavished on the work in the preliminary stages together with hours of labor may be and often are rendered ineffective by the uncertainty of purely mechanical procedures, wherein certain seemingly unimportant details are either totally omitted or else very carelessly observed.

In the production of modern vulcanite dentures, certain features in procedure have come to be recognized more or less in common by all prosthetists as essential to success. For the benefit of those undertaking this work seriously with the determination to eliminate sources of error as far as possible, some of these features, involving conflicting factors, deserve a fuller consideration of their underlying principles and the limitations of the materials used than is usually given to them.

These observations apply to the vulcanizing process as practiced in dental laboratories with greater force, probably, than to any other feature of vulcanite denture work.

In this process, conflicting factors and limitations imposed by the nature of the materials are encountered to a striking degree. Here we have all the chemical phenomena attendant upon the combination of a colloid polyprene (the soluble portion of rubber gum), a vegetable substance, with mineral sulphur, into a new chemical compound. A compound which exhibits, moreover, chemi-

cal and physical qualities entirely new and different from those of either of its components.

In addition we have the physical changes concerned in this combination, one of which, namely the expansion of the material, particularly demands our attention because of its possible effect on the final success and usefulness of the denture.

Confronted by the necessity of providing a mold within which to establish the relationship of the denture base and the teeth, to give form to the new substance, vulcanite, and to confine it within certain limits, we immediately encounter many limitations in the materials available for this purpose.

It is needless to recount the reasons why plaster has been selected in general use, except to say that it lends itself to the manipulations necessary in forming the investing matrix more readily than any other. For this reason its chief limitation, that of comparatively low crushing resistance, is accepted and a compromise reached by adapting the molding process to suit this defect.

Thus we have two factors in direct conflict, viz: the expansive force of the rubber sulphur mixture when subjected to heat in a mold, and the inherent weakness of the mold material we use. Moreover, these conditions are progressive up to a certain point, in proportion as the temperature is raised, and the problem is still further complicated by the incompressibility of rubber which must be reckoned with when closing the mold after packing.

The element of mold weakness is eliminated in the case of the rubber articles of commerce by the use of metal molds. Obviously this is not practicable in the case of rubber dentures and our efforts therefore must be concentrated along the lines of keeping our procedure within the limitations of the materials we use, or in adapting other materials to this purpose. So far the latter has not been productive of successful results.

Since it is not likely that plaster will be displaced in the near future, it is appropriate that its behavior under the conditions to which it is subjected as a vulcanizing mold shall receive as full discussion as possible. If thereby the profession in general reaches a better realization of its inherent defects for this purpose than is now the case, and if the inevitable compromise with these defects is made more rational and effective, then a large part of the failures almost universally conceded to the vulcanizing process will be eliminated.

Pressure tests of plaster as usually made, with dry plaster in open air at room temperatures show high resistance figures, but the same plasters used as vulcanizing molds invariably come out greatly reduced in strength, or even in a mushy condition as is well known. Obviously then the value of plaster for this purpose is dependent upon the conditions in the vulcanizer, namely, heat, moisture and pressure.

It has been more or less taken for granted that its resistance under these conditions is sufficient, no data being available to show in definite terms of measurement just what force it will thus withstand nor at what stage in the process its minimum resistance is reached.

The expansive force of the rubber-sulphur mixture under heat has long been recognized, but I have found no record of attempts to measure this force nor the amount of volumetric change it caused. With these facts in mind and seeking further light on the problems they present, a series of experiments was made at the University of California under my direction. The results, while not conclusive were extremely interesting and significant, and caused a revision of our flasking and packing technic, tending toward greater care in the details of these important steps.

Some of the deductions are presented

here with the hope that they may stimulate further discussion and research along this line, and induce others perhaps to give this procedure on which so much depends in the success of the denture, the care which our experiments have so forcibly shown that it warrants.

A special device was made to fit in an Edson vulcanizer so that pressure exerted on the rods passing through its cover could be measured on a standard testing machine. In conformity with standard practice, the blocks of plaster tested were made up in cubes of two inch dimensions, that is, four square inches area on each face. Therefore in reading the full published report of this research[1] the figures given for the crushing tests must be divided by four in order to express the results per square inch.

In making the tests several mixes of each sample of plaster tested were made with varying proportions of water. As each mix was made, several cubes were molded from it. After the time allotted for setting to take place, these were crushed, some dry in the usual manner, and the others placed in the vulcanizer with water, the temperature gradually raised to 320° F. and the crushing pressure immediately applied at that point. In some instances the vulcanizer was allowed to cool, opened, and the cube then removed and crushed. These showed a loss of strength similar to those tested in the vulcanizer but even greater.

This latter test does not bear out the claim that has frequently been made to the effect that notwithstanding the softening of plaster during vulcanization it will return nearly to its original strength if the vulcanizer be allowed to cool slowly.

It was found that plasters and plaster compounds which showed surprisingly high resistance when tested dry lost from 42 to 73 per cent of their strength in the vulcanizer tests. The brief table here given presents a few examples of these comparative results.

Investment Plaster.	Compression resistance per 4 sq. in. in air.	per 1 sq. in.	Compression resistance per 4 sq. in. in vulcanizer.	per 1 sq. in.
Pottery plaster, (local product, used for models and flasking.)	5000 lbs.	1250 lbs.	2650 lbs.	663 lbs.
"Golden Poppy" (sand, plaster compound with pottery plaster)	4800	1200	2900	725
Weinstein	11600	2900	3200	800
Spence	10000	2500	4000	1000

Some plasters rather widely known and extensively used, showed results much lower than any quoted above, so low in fact, that it is astonishing that they are ever successfully used for this purpose.

Impressed by the apparent weakness of plaster in general under these conditions as disclosed by the tests, and bearing in mind the possibilities of the expansion force of rubber in vulcanizing, it was determined to make some attempt to ascertain what pressures plaster might have to withstand, for instance, in a bolted flask, also in closing a flask with an excess of rubber without a thorough softening by heat.

[1] "A Study of the Behavior of Plaster of Paris as an Investment in the Process of Vulcanizing Dental Rubber," *Journal of the National Dental Association*, Vol. VI, (1919), p. 432.

It is found by computing the increase of power transmitted through the screw of the ordinary flask press that a pressure of 8000 pounds or more is often exerted on the contents of the flask by a force of 50 pounds applied to the handle. Think of the enthusiastic efforts of a sturdy young man who is not likely to stop with a mere 50 pounds unless the press breaks or is wrenched from the bench. Then compare the staggering result (only about 16000 pounds or so) in the interior of the flask packed with a generous surplus of incompressible rubber with the resistance of the best sample of plaster compound shown in the table just quoted. Is it any wonder that teeth are displaced from occlusion when the denture is finished or that the plate is said to have "warped" during vulcanization?

To test the rubber expansion force a steel tube closed at its lower end was fitted in place of one of the rods in the cover of the Edson vulcanizer, so that it extended to the bottom of the pot. A rod was also fitted so that it filled the bore of the tube snugly without binding.

Denture rubber was packed in the tube under a heavy pressure to expel trapped air, heated to drive off moisture, allowed to stand for a period of time to cool, and again put under pressure with the rod in place for the initial measurement of volume. Then with the upper end of the rod in contact with the pressure head of the testing machine, the vulcanizer containing water was slowly heated till the thermometer showed 320° F. as in the plaster tests.

The testing machine registered such astonishing force even at low temperatures as to create the impression that something was wrong. All items were checked, and found correct. The surface area of the mass of rubber being tested did not exceed three-eights of an inch in diameter, or approximately .125 of a square inch. Therefore when the pressure reached a total of 1500 pounds, the experiment was abandoned, since with even this small surface of rubber an expansive force in excess of the total resistance per square inch of the best plaster investment tested had already been reached, and for the purpose of the research at that time it was useless to continue. As to how much higher pressure could be produced in this way, we may only guess.

It was realized that this particular experiment was not sufficiently complete upon which to base any positive conclusions, but it indicates that no plaster investment is strong enough to withstand the expansive force of rubber if rigidly confined in vulcanizing.

Exactly what happens to plaster during vulcanization is of course impossible to determine without exhaustive research and special apparatus. Without doubt, one of the changes it undergoes is dehydration, which accounts for its weakness; for when samples which have been treated in the vulcanizer as described, are removed immediately upon opening it and are at once examined under the microscope, the plaster is seen to "set", that is, form new crystals with great rapidity when water is added, and to show exaggerated expansion in so doing.

It has been possible to establish the point at which dehydration begins at about 225 degrees F. but it is relatively slight and proceeds but slowly up to say 275 degrees F. though much more rapidly at higher temperatures. The expansive force of the rubber sulphur mixture becomes apparent soon after the boiling point of water is passed, and increases proportionately up to about 275 degrees F. after which it is much less. (See full data in article previously referred to.)

Therefore it is possible to express these conflicting factors by two curves or graphs, one beginning at 225 degrees F. and representing the constantly *decreasing* strength of plaster investment with the rise of temperature to 320 degrees F.

and the other curve beginning at 212 degrees F. and representing the constantly increasing expansive force of the rubber up to the maximum temperature employed, 320 degrees F.

Following this up logically, it is easy to see that if vulcanizing be carried on at low temperatures, both the volume and the force of expansion will be kept down to the minimum, and at the same time dehydration and weakening of the plaster will be kept below the critical point. Apparently the only objection to low vulcanizing temperatures that has been made is that of the extra time required, and the work can usually be so arranged that this is of no consequence.

Those who have been concerned in this research have drawn from it certain conclusions. The facts here presented are sufficient to account largely, if not entirely, for displaced teeth and for warped and porous plates when high pressures are used in closing flasks and when high temperatures are used in vulcanizing in bolted flasks. There is also an apparent relation between these facts and the shrinkage of vulcanite some writers seem to be so much concerned about, for if the rubber gum and sulphur mixture is not forced to expand, but is allowed to affect the combination slowly, with the minimum of volumetric change, into a homogeneous mass, it is evident that the later contraction will be materially less.

In the light of these facts, our present conviction is such that we are impelled to say emphatically, that we are done with bolted flasks, we are done with ordinary flasking plaster for vulcanizing models, we have no use for flask presses unless a small hand wheel like that of a water faucet, is substituted for the long handle; furthermore, we want the temperature kept at the lowest practical point for vulcanizing, with the flask in the water in the vulcanizer, not in the dry steam, and finally when the vulcanization is finished, we want the vulcanizer cooled, opened, and the plate removed as fast as possible.

Discussion

I. L. Furnas, Cleveland, Ohio: The expansion of plaster and plaster compounds has been very hard to determine, accurately, because of the nature of the soft mix, the element of heat, etc. I have obtained the best results with the mercury column, but even this has, at times been very unsatisfactory.

The compression of plaster and plaster compounds is another very important thing. A 1-20 pitch flask bolt and a pressure of fifty pounds applied on the end of the ordinary four and one-half inch flask wrench will exert over four tons (8333 plus lbs.) pressure per square inch on the face of the cast in the flask. Dr. Prothero of Chicago established this as a fact about 1908 or 1909. At first I made all tests on the basis of the square inch, but recently they have been confined to one-fourth square inch because that more nearly approximates the occlusal surface of a molar tooth. What we are trying to establish is the amount of compression or power necessary to drive the tooth into the investment and out of its proper relation in the flask.

The thing, however, that appeals to me as being of most importance is what I have termed the temperature deterioration of this cast material in the flask. In connection with this we must carefully study also the temperature flow of the rubber, or base materials that we are going to use. At what temperature does this cast material begin to deteriorate? What is the temperature flow of the rubber? The temperature necessary to complete the flow of the rubber in the flask has caused how much deterioration to the cast and matrix? Are we shaping and forming our vulcanite bases over broken down and deteriorated casts?

One of the rubbers that I tested had a temperature flow that ran as high as 292 degrees to 295 degrees F., that is the time when that rubber ceased flowing, ceased placing itself in the spaces around the pins of the teeth, in the diatoric openings of the teeth, and in the fine lines and detail of the matrix.

Another thing to determine is: when does this temperature deterioration, in this cast material start? My experience has been that it starts at many different points, varying with the different materials, the average being about 212 degrees F. or as soon as pressure begins in the vulcanizer.

The method that I used for testing was making cubes one inch square and first de-

termining the initial and permanent set; these were then placed in the vulcanizer and run to different temperatures then removed and tested. About eight or ten blocks of each material were used. There was almost no difference in the tests when the cubes were open or when they were protected in small iron flasks.

The tests for compression were made by filling an iron mold twelve inches long, one inch wide, and one inch deep with the cast material and tested for the initial and permanent set. As soon as the permanent set was reached it was immediately placed in the compression testing machine and tested. Compression tests followed every thirty minutes up to three hours, then every hour for three hours, then at twelve, twenty-four, and forty-eight hours.

The tests for the temperature deterioration that I have just described proved of no value at all because I found that when the same materials were tested in the same manner in the presence of H_2S gas there was a decidedly higher percentage of deterioration.

Dr. Mauk's technic of opening the vulcanizer immediately after vulcanization, or making a forced cooling as I have termed it, I believe is absolutely wrong. With the experiments that I have made and the experience that I have had I cannot accept that at all.

Neither can I accept his technic of doing the vulcanizing under water. I use but four ounces of water in a three case vulcanizer and I am very careful to see that my flask is raised well above it.

My formula for vulcanizing ordinary cases is as follows:

Run the temperature up to 280 degrees and take thirty minutes to advance it to 320 degrees and hold at 320 degrees for one hour, and for each 10 degrees below 320 degrees add one hour's time never vulcanizing below 300 degrees. Vulcanization starts at 247 degrees in some cases, but rubbers with high temperature flow will not begin that soon.

Victor Sears, Salt Lake City, Utah: Dr. Mauk speaks of carrying on his experiments with the case submerged in water. Later he says that the cast material is dehydrated. I should like to know if his explanation is this: that the cast material is dehydrated while immersed in water? That is, if you take two casts, two flasks, submerge the first flask, the lower one, leaving the upper flask out of the water, after the vulcanizer is cooled down, if you take those casts out, the lower flask will be found to be softer? I would like to know if that conclusion is the same one that Dr. Mauk has reached? And if so, how he harmonizes the fact that after vulcanization has been completed, the investment material, which is submerged, is softer than that which has been in the upper steam chamber?

Dr. Mauk (Closing): I think if we will go into that we will see the explanation of it. The dehydration, as we have concluded, takes place in spite of the fact that we have this heat. There is some conversion of the moisture into gas, into steam. In other words, there is some dehydration in spite of everything; if you apply heat, there is going to be some dehydration. Now the explanation is, as I see it, the softening of this plaster. You must go back to the study of crystallography for the explanation of that. Plaster when dehydrated loses its strength, assumes different crystal forms. If it is allowed to dehydrate under the microscope, it will form practically the same crystals as it originally formed. That is what takes place in vulcanization after you shut off the heat in your upper cast.

I would explain that in this way, it has assumed or taken to itself again sufficient amount of moisture to produce crystals, but does not become dissolved in the water, to a certain extent, or solution process has not taken place, as it would in the cast which is submerged in the water. That cast which has been submerged, the plaster has passed the crystal stage, but in passing into the crystal stage has become practically, gone practically into solution. That seems to be a logical explanation of that phenomena of that fact as you have stated it.

BABY FOOD

By WALTER H. O. HOFFMANN, M.D., Chicago, Illinois

(Read before the Chicago Dental Society)

IT IS always well to make a historical review if we want to discuss a subject that has interested the world for centuries. We sometimes have some of the conceit taken out of us by doing so. The first book on babies was written by Soranus about a hundred years after Christ. Apparently this book gives us a summary of the knowledge of that time on the subject of baby feeding. Bottle feeding was evidently in vogue and not very successful because he lays such a strong emphasis on breast feeding and points out that that is really the only food for infants. We surely agree with him heartily today, although we may feel that artificial feeding has made great progress. It still holds good, however, that breast milk alone gives the baby not only the proper food to thrive on but also transfers to the child immunity and resistance to diseases which we cannot give him by any other food. This immunity is lost when artificial food is given.

He also has in his book a remark which some of us seem to have forgotten, that, a baby will not cry from hunger except at meal time, and if the baby does cry at any other time it is essential for us to find out the reason and not simply feed him.

He knew that long intervals of feeding were better for the baby than short ones. In other words the stomach needed a rest. He also pointed out that the baby should not be fed at night. We still find, however, that many young babies are fed at night, which establishes a habit that is hard to break and is also very hard on the mother who needs the rest at night in order to produce good milk.

He also said that the position in which a child was held while nursing was of great importance. The air bubble which is in every stomach while empty, cannot escape if the child lies absolutely flat, still we find that mothers are advised to nurse the baby while lying in bed. The soft mattresses and springs now in vogue sink down in the middle, so unless special care is taken, the baby lies so that it has to drink uphill instead of downhill. The air bubble has no chance to escape which often leads to so-called colic.

About a hundred years later, the Roman empire made an attempt to save babies which were otherwise lost. Under Roman law the father had the right to decide at birth whether he wanted to rear the newborn or not. If he decided that the child should not live, and he so decided often, there were two ways of disposing of it, one was to leave it to the mercy of the elements or, make it the prey of wild animals, the other was to leave it on the neighbor's doorstep. The latter fashion is apparently still prevalent.

Eventually an orphan asylum was

started in Naples but at the end of a very few years the mortality was so great that they abandoned the idea as it did not pay the state to keep the asylum open.

Now let us see what we are doing today. A few years ago I was collecting statistics on the death rate of children, and found that in quite a number of asylums the death rate was still extremely high.

However, the history of an orphan asylum in a city a little farther south, which is peculiar from the fact that it has practically the same type of children coming into it from year to year, has shown us what modern science can do. The building on one side houses the mothers who give birth to illegitimate children, and on the other side of the building these children are kept after the mothers leave. The death rate in this asylum was extremely high seven years ago. The man in charge under whom this death rate occurred, finding out that other institutions had much better results made it a point to give the subject of artificial feeding greater attention with the very gratifying result that the death rate is now somewhere around three to four per cent.

Medical science did not make any progress in children's feeding for many years and only in the middle of the nineteenth century do we find that medical men occupied themselves with artificial feeding. Thousands of articles have been written on this subject since and the result is that breast milk is still the food for babies.

We realize today that the interval between breast feeding must be long enough to let the child's stomach be empty for awhile. The reason for that is that the hydrochloric acid formed continually by the stomach not only helps to digest the food but also disinfects or cleans the stomach. This sterilization of the stomach has also a beneficial influence on the bacterial flora of the intestinal canal.

We know from many observations that three hours or better four is the best interval between feedings. It is perfectly satisfactory to nurse a baby four to five times between six in the morning and six at night and once during the night, in early infancy. The length of the interval depends on the amount of milk a baby takes in at each feeding.

One of the fallacies which we encounter in the first few days of life is the forgetting of the well-observed fact that a baby does not take the same amount at each feeding, although its daily quantities are nearly the same. In most of the hospitals a baby is weighed before and after each feeding and if it is found that the amount of an individual feeding taken from the breast is not large enough, a supplementary feeding is given. This practice is surely not to be recommended as it does away with the natural process of adaptation between mother's breast and baby which does not establish itself so very quickly. It probably would be better to give the child a chance for five or six days to take from the mother what it will, before we start in giving it artificial food.

It is very well known that only thorough emptying of the breast will lead to greater milk production and this emptying will only be done by the hungry baby.

Artificial feeding given during the first few days of life is hard for the baby to digest. It interferes with the appetite and in that way makes the baby less eager for the breast. However, when it has been definitely established, that methods which increase the output of breast milk do not succeed, it will be necessary to give the child artificial feeding.

What will help to increase the produc-

tion of breast milk? The first and most important is the emptying of the breast. As has been noted, this is usually done by the baby, but if this fails we can strip the breast by hand or use a pump after the baby has nursed. This will increase the output of milk. The second is the proper food for the mother—this should be those things which are essential for good health, and in addition a liberal quantity of water, and third but not least, sufficient rest and sleep.

Although breast milk is an ideal food we have to recognize the fact that it does not remain so for the rest of the child's life. The increased demands on the child's strength when it starts to sit up, at about six months, calls for additional food, particularly of the cereal type. We prefer to give this food in the form of a thick farina gruel which is fed to the baby with a spoon, having in mind that sooner or later the child will have to learn to take its food in that way.

At eight months another food element is given to the child and that is iron. Nature deposits enough iron in the liver during the last month of pregnancy to last eight months. Breast milk contains only infinitesimal quantities of iron. We see in children who are breast fed only, beyond eight months, severe anemias on account of this deficiency.

There may be many ways of giving iron to children but the most satisfactory is to give it in the form of leafy vegetables. This not only supplies them with iron but also with the vitamins which recent studies have shown us to be essential to good health.

At ten months give the child a crust of bread and zweibach in its own hand to chew on, so that it will learn to feed itself. Under ideal circumstances the last breast feeding should be given to the child on its first birthday.

Occasionally breast milk seems not to agree with the baby. In these cases we have to rule out too frequent feeding, or overfeeding, in quantity more than in frequency, which usually shows itself by vomiting after feeding, colic, and frequent stools. The remedy for the first is the lengthening of the intervals between feedings, and the remedy for the second is the shortening of the time of each feeding.

The usual rule in textbooks says that the baby should be on the breast for twenty minutes. This apparently has become a standard. We often see that newborn babies are made to stay at the breast twenty minutes, when there are only a few drops in the breast. This prolonged nursing very frequently leads to the sore nipples with dangerous consequences of abscesses of the breast.

The average baby will take out of the breast in the first five minutes more than one-half, and in the next five minutes practically all that is left in the breast. There are occasionally so-called hard milking breasts where it will take the baby longer to empty the breast than in the average case.

There are other cases, although rare, where breast milk does not agree with the baby. The following is an illustration.

A woman living in Chicago nursed her baby perfectly satisfactorily for five months. She then took a home in the country and to reduce expenses raised chickens. She soon found out that her neighbors were doing the same thing and it was hard to get a market for the eggs. Being of an economical trend and figuring that eggs are a good food, she formed the habit of consuming large quantities of eggs daily. The baby simultaneously developed an eruption over the skin of the face and extremities which gradually spread over the whole body. Finally it became drowsy. When brought

to the office it was hardly able to hold its head up and had a generalized skin eruption and oedema of hands and feet. A careful examination brought out the above history and the mother was advised to eliminate eggs from her diet. To the surprise of everyone in five or six days the baby was perfectly well. This is one of those cases where the excessive intake of one food element changed the mother's milk so that it became dangerous food for the baby. Other food elements might have a similar effect.

Just the same as the excessive intake of one particular food element in the mother's diet might lead to trouble in the baby, so might the absence of an essential element in the mother's diet produce trouble. The best known example of this kind is beri-beri which as you know is a deficiency disease. Babies who are nursed by mothers who have beri-beri develop it also.

For many years people have had the idea that certain foods taken by the mother might effect the baby, although it is a well known fact that Eskimos produce good milk on a diet of mainly meat, fish and fat, and the mother of the tropics produces good milk on bananas and other tropical fruits. So in medicine for a long time there was the statement current that food had no influence on breast milk. Only very recently we have come to realize that food might have an influence.

I would like to emphasize that it is not advisable to wean a baby from the breast because we believe that there is trouble, but rather find the reason for that trouble and remove it. Mothers very often give as the reason for weaning their babies that they have insufficient breast milk. It is better to give the baby some breast milk than no breast milk at all.

Feeding is not the only thing that influences a baby's thriving. I was called one night at eleven o'clock to see a baby who was having so-called feeding troubles, crying persistently day and night. Looking for the baby I found it under a pile of blankets, pillows and shawls. As soon as we had unwrapped it, it stopped crying. The mother told me that she had noticed over and over again that the baby would be smiling and happy while undressed but cried and fussed when dressed. I persuaded her to replace woolen underwear by cotton and to use less covering. There was no more feeding trouble.

Mothers who give birth to babies in hospitals are taken into the room where the babies are kept shortly before they leave. They find these rooms are warm. After coming home they try to keep the room warm and dress the baby very warm also. This combination leads to trouble. In the hospital the baby wears little clothing and is kept in the warm room, at home the baby is not only kept in the warm room but wears a great deal of clothing.

Next to breast milk the best food is some animal's milk. The most practical in this country is cow's milk as it is produced most economically. There is however no objection to the milk of other animals, so we find reindeer milk used among the Eskimos, and horse's milk among the Arabs.

We will limit our discussion, however to the use of cow's milk. Outside of having a different chemical and percentage composition from mother's milk, cow's milk has to travel usually a long road before it comes to the baby. During this time it is an excellent media for bacteria to grow in. These two differences make certain procedures necessary before the milk becomes fit food for the baby. Mother's milk forms small, soft, curds in the stomach and cow's

milk forms hard and large ones. The little calf ruminates its food and chews the curd over. The baby usually does not do this.

The careful observations of Dr. Joseph Brenneman have shown us that boiling, diluting and adding carbohydrates to cow's milk makes it much more digestible for the baby. This boiling of milk has the additional advantage of destroying the bacteria which are dangerous to human life and which might be present in milk. But the mother will say boiling makes constipation and destroys vitamins. One usually can overcome such a constipation readily and the vitamins are easily replaced by giving to the baby orange or tomato juices or even water from leafy vegetables.

Bottle feeding should be supplemented by the same additional food that is given breast fed babies at six months. It is safe to say that on the whole a bottle fed baby encounters more difficulties than breast fed babies, and the management of bottle feeding requires much greater knowledge.

To a group of dentists a point of vital interest, of course, is the relation between the management of the baby's life and the growth of its teeth. Unfortunately the knowledge of both the dental and medical profession on the subject is at this time somewhat limited. A few points, however are well established. The influence of the mother's diet on teeth is as yet only conjecture for we have no definite data on human beings. In an animal experimentation, however, it has been definitely shown that if there is a deficiency in the mother's diet the teeth of the offspring are defective. We know that it is wrong to attribute so many of the difficulties of infancy and childhood to teething, for when there is irritability, fever or convulsions, some other explanation is usually to be found such as an infection or some nutritional disease. Normal children, especially breast fed children, will rarely have trouble from their teeth. On the other hand we know that diseases due to faulty nutrition or infections such as syphilis make definite impressions on the teeth themselves.

PERICEMENTAL DISEASES[1]

By MAXWELL M. DIXON, D.D.S., Los Angeles, California

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

INFLAMMATORY disease of the periodontal membrane and alveolar process is probably an evil co-existing with man, himself. Skulls belonging to the earlier cave-dwellers and those of the ancient higher civilization show upon close observation, deposits around the roots of teeth and the resultant alveolar absorption. The recent anthropological discoveries in Egypt have proved this conclusively. Therefore this disease is not essentially a modern one, but one which attacked man early in his evolution. A brief historical survey is interesting.

H. A. Fouchard, although he recognized the disease's characteristics and important symptoms, advanced no theory as to its etiology. An article written by Jarice in 1822 "Pyorrhea Inter-Alveolar Dentaire," discussed the disease before the medical world at that time. In 1875 John T. Riggs, also described this condition in the now classic "Suppurative Inflammation of the Gums and Absorption of the Alveolar Process."

This disease is known by many names, such as, pyorrhea alveolaris, phagedenic pericementitis, Rigg's disease, interstitial gingivitis, peridontoclasia, etc.

In the process of evolution man has sacrificed physical factors in his intellectual advancement. Among the structures suffering degeneration are the face, teeth, gums and alveolar process.

Scientists, describe two types of heads, the brachycephalic or the round head of the Teuton, and the dolichocphalic or long narrow head of the negro. The former has a large, round dental arch, which may or may not protrude, while the latter is characterized by long, protruding jaws and arches.

The *normal tendency* of civilized life is to harmonize and produce a mesaticephalic type which is intermediary between the extremes described. In this process of assimilation, the jaws are growing steadily smaller because large ones are not necessary and the masticatory structures are all undergoing changes in shape in their adaptations to this new environment.

The smaller jaws and teeth of modern times indicate less nutritional impulses to those parts coincident with the alimentary requirements. This leads to local degeneracies which diminish the natural disease-resisting powers inherent to the oral tissues, thus making the dental apparatus of modern times more susceptible to diseases of inflammatory nature.

The causes of pericemental disease may be classified as follows:

(A) Predisposing: Metabolic disturbances; perverted internal secretions; cardio-vascular disease; drugs.

(B) Exciting Causes:

1. Irritating foreign bodies—calculus; detached toothbrush

[1]ACKNOWLEDGMENT.—In preparing a manuscript on a subject such as this, it is impossible to mention all of the authors to whom one is indebted for suggestions, but the writer desires to express appreciation, particularly to the following: Pickerell, Black, Johnson, Burchard, Endelman, Hecker, Pollia, Head, Stillman, McCall and Talbet.

bristles; orthodontic appliances; injury from rubber-dam clamps; overhanging restorations.

2. Defective Dentistry—Injurious prosthesis, which, owing to their poor conception or improper execution, permit the accumulation and subsequent decomposition of food, or because of mechanical error, have an injurious effect upon the periodontium of the abutment; faulty contacts; deliberate devitalization of the pulps; defective root-canal surgery; defective anatomical restorations; dirty instruments.
3. Anatomical — Improper tooth form; irregular arches; congenital anomalies; malocclusion.

A careful survey of the above mentioned causes will strike the student of these conditions that no *one* factor is responsible for the disease. The etiology of pericemental disease must be considered from constitutional, local and bacteriological viewpoints. Unfortunately, the constitutional causes have been neglected by the majority of writers and complete success of our treatments cannot be achieved unless this phase receives due consideration.

It is not uncommon that a constitutional disturbance may exert its expression locally. It is important to bear in mind that this disease is not a product of bacterial activity alone, as no specific organism has yet been consistently associated with the disease. To consider this disease solely from its local inflammatory condition of the gums, and that the absorption of the alveolar process is the result of the irritation and inflammation, is to overlook the most important part played by the bacteria themselves.

A normal periodontal membrane is a highly specialized fibrous tissue, the fibers of which are split up into six specialized groups. The function of these groups of fibers is to attach the tooth to the alveolar socket, the alveolar crest, the gingiva, and the opposing tooth, and in accordance with these functions, the architecture of these groups is determined.

Pathology

The exciting cause produces an inflammatory reaction of the periodontal membrane at the cemento-enamel junction. This inflammatory process sooner or later extends to the alveolar process at the inter-proximal septum, and toward the apex, involving the periodontal membrane in that direction.

According to the later researches, the lack of the epithelial covering at the cemento-enamel junction of the gingiva presents a very favorable tendency in this direction. The lesion from now on presents the usual characteristics of a varying degree of the destructive inflammatory activities.

Deposits of calculus or any other irritants at the cemento-enamel junction will produce a gingivitis. In many cases, it is impossible to determine just where the inflammation begins, because most patients when first seen present a gingival as well as a pericemental lesion.

When the degeneration of the pericementum occurs, which is usually at the gum margin, it is sooner or later accompanied by suppuration. The suppurative process loosens and destroys the retentive fibers of the periodontal membrane and causes loosening of the teeth.

This is usually accompanied by a flow of pus from the affected alveolus. It is a singular fact that we frequently find teeth subjected to severe pericimental lesions which are free from caries. These belong to a highly developed type of tooth form. The degree of destruction and suppuration may have no bearing upon the degree of inflammation, as

chronic inflammatory processes may be present for a long time, without recession of the gums.

In non-septic pericementitis, suppuration is absent and is characterized by extensive fibrous changes, which are the results of vascular disturbances. This expression of the disease may be found at the cervical margin along the side of the tooth or at the apex, and the disease may extend in any one point, and involve the whole of the periodontal membrane structure.

The inflammatory changes which have just been described usually give rise to proliferative changes; however, there is another variety in which atrophy of the membrane itself occurs. In this condition, there seems to be an absorption of the alveolar tissue without any coincident inflammatory phenomena. The gum follows the recession of the alveolar wall, which is affected always labially or buccally until the cementum is exposed.

No discussion of pericemental disease would be complete without some consideration of the relationship which calcareous deposits bear to it. In practically *all* cases, such deposits are associated with the lesion; however, there are rare occasions in which inflammatory reactions and their consequences can be noted in the gums, periodontal membrane and process; even to the extent of loss of the teeth, *and no deposits of calculus are present.* It is supposed that the reason for this peculiar absence may be explained through some variations in the calcium metabolism.

It is to be noted that calcareous deposits usually are in proportion to the amount of pus present. The theory of calcareous deposits seems to favor that such deposits originate from the blood or secretions.

In inflammatory reactions, there is some slowing up of the blood flow which helps the precipitation of this calcareous matter. Diseases which affect the general vascular tone of the body are *not* infrequently associated with profuse calcareous deposition.

It is customary to give general systemic causes a consideration, *only* secondary to the local influences, such as chronic inflammation, persistent accumulation of pus, and other exudates.

Two types of calculi are recognized, the salivary, which is characterized by no formation of pus pockets, or occasionally shallow ones, and, which produce the destruction of the periodontal membrane and process, in line with the level of the deposit. The mechanism of this change may be summed up, in the atrophy produced by the pressure of the deposit, on the underlying tissue, which predisposes bacterial invasion, and microorganisms, which carry on the work of destruction.

The serumal calculus is characterized by the formation of pockets and a considerable degree of suppurative inflammation, greatly in excess of that found in the salivary type.

The serumal calculus is harder in texture and of a darker color. This peculiar tendency to pocket formation differentiates serumal calculus from the salivary.

Diagnosis

The first step in the establishment of diagnosis of such cases is to procure a complete oral radiographic examination. In the study of the films, particular note should be taken of the periodontal membrane line, the periodontal lamella, the calcium salt content of the process, which may be either increased or decreased, according to the location of the lesion, the presence of irritating foreign bodies, and in exceptionally fine radiographs it is possible to detect the extent of vascular disturbances in the gingival tissues.

Then impressions should be taken,

study models constructed and the relative position of the teeth studied. With the radiograph and the models, the plan of the case and the various factors contributing to the disease are manifest, as the radiograph indicates extent and type of the pathological disturbance, and the study models point out the anatomical and acquired injurious agents.

The clinical examination represents the last and most important step of the diagnosis. A brief description of the more essential fundamentals is submitted. A general survey of the condition of the mouth, as a whole, is first made. Whenever the disease is extensively generalized throughout the oral tissues, it indicates a lowered vitality. This is a valuable sign of the patient's general health. Too much emphasis cannot be laid upon the necessity of having an accurate idea of the individual's physical condition.

Next, the occlusion is tested and the relationship of the stress to the local disturbance is noted. Then the general condition of the teeth and their movement is considered. The teeth themselves are next individually examined for caries, defective restorations, and so forth. The cleanliness and care of them must *not* be overlooked. If any pockets exist, their depth is determined, and checked up with the radiograph.

Attention is now directed to the gingiva. The picture presented in gingivitis is the same as found in any other mucous membrane inflammatory process. The first changes are seen at the margin, which is swollen, edematous, and reddened. This discoloration and swelling may be pronounced in severe cases to the extent of tumefaction and purplish hue.

One very important observation is the movement of the teeth out of line, the result of the weakening of the various groups of periodontal membrane fibers, from the inflammation. This disturbance in the balance of pull causes the fibers of the healthy side to draw the tooth away from the diseased side. Deeply interlocking cusps in opponent teeth may prevent this movement for a time.

In the beginning, the alveolar bone is not accessible to the probe, but later, owing to the peripheral molecular necrosis which affects the gingiva and periodontal membrane, the bone tissue is exposed so that it may be reached with the instrument.

The recession of the gingival interproximal septum indicates atrophy of the alveolar walls and is associated with serumal calculus whose irritation produces an involvement of the periosteum, as well.

It is very difficult to recognize the existence of pericemental disease caused by hidden deposits that affect the degeneration of the periodontium in a direct line towards the apex. In these cases, the periodontal membrane may be found attached to the other portions of the root which are not involved, and the gingivitis is very slight; and although the gum margin is somewhat receded, it still retains its normal festoon.

The importance of percussion in detecting single teeth which have undergone inflammatory degeneration at the apical half cannot be over-estimated, as the gum margin remains unbroken at its attachments. These teeth are loose, and usually sore and tender to touch.

Whenever a pus pocket is detected, the local irritant responsible should be investigated before the inflammation spreads to the deeper periodontal membrane and alveolar process areas, as the bone is more easily affected in the deeper layers, and may spread and involve the entire structure.

The presence of pus, whether it orig-

inates from the gingiva, periodontal membrane, or from the bone tissue itself, must be regarded as a symptom of pericemental disease. It must be borne in mind that this pus may discharge at the gum margin, along the alveolus itself, or between the teeth.

Occasionally no pus will be seen, where the inflammation would seem to indicate its presence. In these cases, it probably will be found upon the removal of the deposits of calculus, which prevents the freedom of pus flow. A pathognomonic sign of persistent gingivitis is an increase in the space lying between the tooth and the gum margin.

Treatment

It is of the utmost importance that in our treatment we maintain the maximum degree of functional activity of the cellular elements because the defensiveness of the area depends upon the tissue integrity. The opportunity for recovery is in direct proportion to the tissue's vitality. It is customary to remove the local irritants, such as calculi, defective restorations, etc., first. In the instrumentation, greatest care should be exercised to prevent injury to the cementum, if possible.

Curetting the alveolar tissue is indicated when the overlying structures have been destroyed, thus exposing the bone. Here again let it be mentioned, that a large percentage of gingivitis may be caused through operating which is abusive to the soft tissues, and a normal unblemished gingiva should receive the utmost respect from the operator. I do not wish to be misinterpreted, that radical surgical measures should not be employed when necessary.

Smoothing and polishing the crowns of the teeth is usually the next step, and after completion of all surgical measures, then medicaments are applied.

The pus pocket is an important focus of infection. While we recognize the fact that some individuals have sufficient resistance to take care of the absorption from these pockets for years, yet, there is no certainty that such persons are really free from injury.

Since the possibilities of dangerous lesions may result from these pockets, we must protect the patient from this source of systemic poison, and it becomes our duty to free him from such chronic suppuration.

Often the question of the service which teeth with pockets may give is used to justify their retention. No set of natural teeth with such pockets is better in its general effect because of the improved mastication, than artificial dentures which relieve the individual from the jeopardization of his health. Patients who are apparently well, having such foci in their mouth, should not be permitted to go on oblivious of the possible menace.

The most satisfactory form of treatment of pericemental disease is preventive. Preventive treatment is essentially that which helps to control conditions resulting from inflammation and suppurative detachment of the periodontal membrane, causing subsequent destruction of the alveolus. The aim in the treatment of gingivitis is to halt the process so as to keep the periodontal membrane from being attacked by suppuration.

In the treatment of simple gingivitis, the gingivitis itself is of little consequence.

The highest type of preventive dentistry in the adult, is to halt the inroads of periodontoclasia by recognizing the serious consequences that may result from a little area of gingivitis. Thus, our treatment becomes prophylactic in its nature, and preventive rather than symptomatic.

After the tissues have been placed in a

healthy condition, the patient must be impressed that they require constant attention because tissues once diseased are liable to recurrence of disease if conditions are unfavorable.

Since it is not the pus which causes the absorption of the process and loss of the tooth, operators must learn to recognize the inflammatory condition, which leads to these changes, and it must be remembered that pus is the result and not the cause.

Summary

1. Pericemental disease is not the result of a single factor, but a combination of changes incident to evolution, constitutional deficiencies, exciting causes of anatomical and acquired nature, and bacterial activity.

2. The pathological picture begins at the gingiva near the cemento-enamel junction, and sometimes in the periodontal membrane. The peculiar defect of epithelium at this point presents favorable opportunity for the institution of inflammatory changes.

3. Pericemental disease may be septic or non-septic and the results may be proliferative or atrophic.

4. The relationship of calculus to pericemental disease is well known, and the changes of salivary and serumal calculus are characteristic of the types, the former being non-pocket forming, and the latter with pockets.

5. In the diagnosis, radiographs, study models and clinical examinations form the necessary considerations.

6. Under *no* circumstances is the patient's physical condition to be overlooked.

7. Treatment must not damage the tissue integrity.

8. Teeth with irremediable pockets, because of their possibilities of foci of infection, should be sacrificed, rather than retained at the risk of the patient's health.

9. Preventive treatment is preferable over the symptomatic, and the most satisfactory preventive results are obtained in the early recognition of disease.

10. Pus is the result and not the cause of the alveolar absorption. Therefore, the recognition of inflammatory phenomena assumes a most important consideration.

11. Patients should be impressed with the necessity of the constant attention which their tissues require, after once being successfully treated.

Discussion

T. Sidney Smith, San Francisco, California: I thoroughly indorse all that has been said regarding the need of employing gentle accurate methods in both prophylactic and surgical work. To secure a perfect reattachment of the separated soft tissues to the roots, which is the only sane method of treating periodontal septic lesions, we must understand and observe biological requirements of the tissues; we must remove the last trace of calculus. In addition to this, however, we must surgically freshen the entire surface of the involved cementum without exposing the dentin at any point, because the soft tissues do not attach themselves to dentin as they do to cementum. The exposed dentin becomes hypersensitive and the overlying gum tissue remains swollen and red. When it is remembered that the gingival third of the cementum is frequently not thicker than paper, and the surgical preparation of it must be accomplished entirely by the sense of touch, one can readily understand why so many have failed in this work.

It is equally important that the soft tissues should be handled with the same exact degree of care. If they are to reunite themselves to the roots at all they must do it rapidly, because the prepared surface of the cementum will very soon become coated with debris. This coating of debris prevents the reunion by holding the tissues apart. There are at least two reasons why we should try to avoid lacerating or bruising the tissues during treatment. First, that the amount of

repair required may be very small, and second that the cells on the surface of the wound may be unimpaired and ready to do their work. All the cells that are bruised or damaged in any way must be either absorbed by the tissues or sloughed out of the wound; they are a decided hindrance to the living cells.

For these same biological reasons I disagree with Dr. Dixon that we should use medicinal agents in the treatment of these lesions. When used without surgery they cannot produce the necessary freshened living surfaces, and when they are introduced into the wound after the surgery has been completed they destroy many of the cells which should take part in the healing.

W. C. Smith, Pasadena, California: In my practice of orthodontia I see incipient pericemental diseases in young patients. The causes may be the result of imperfect dental operations or an inherited tendency toward so-called "pyorrhea alveolaris."

I submit for your examination a deciduous molar recently extracted from the mouth of a boy ten years old, an excessive Class 2 case, showing deposits of serumal calculi at the gingivae. He has a turgidity of the gums and I venture the prediction he will have pericemental troubles all his life. His mother had a Class 2 case, and has lost nearly all her teeth from pyorrhea.

That malocclusion is a contributing cause of diseases of the periodontal membrane is too well established to call for much discussion at the present time. Normal occlusion of the teeth will enhance the vital resistance of the tissues to pericemental disease, whereas malocclusion or traumatic occlusion tends to lessen it.

Walter Hughes, Oakland, California: I wish to take exception to the statements of Dr. Smith. I believe, after all operations, the root surfaces should be left smooth and polished. If there is any calculus or foreign matter left in the crevice around the tooth there cannot possibly be a thorough healing of the part. In the opinion of quite a number of us, the root surfaces should be left clean and polished, even though we have to use abrasives to polish it. The abrasive is washed out with water.

Dr. Dixon, (Closing): As to caries, you all know we have cervical irritation. Anything impinging on the tissues, naturally causes irritation. I did not try to convey the idea that in every case of a diseased periodontal membrane, the teeth were healthy teeth. We have so much caries and decalcification of lime salts it keeps us busy all the time to repair these alone. Constitutional causes seem to be in question.

On the use of medicaments, it is noted that a man who uses certain kinds of drugs, is doing a certain class of work and, while doing the best he can, includes medicine and derives a certain benefit therefrom; another man does the same kind of work, uses none and gets the same result. Nature is very kind to us.

It is not necessary to polish tooth surfaces absolutely smooth. If rough and plaquey I polish them; it helps to keep them clean, that is all. With five different members of a family, you may see one of them once every six months, one every year, and one every six weeks, and the teeth of the last named patient will be no cleaner than those of the others.

Some use grits and wash them out. I do myself, and get along very well. I polish tooth surfaces and used to be very careful about my blood clot. Some pathologists say the clot is the finest media in the world for bacteria; and some wash them out, and get along fine.

THE LINGUAL BAR DENTURE

By E. H. BRUENING, D.D.S., Omaha, Nebraska

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

THERE are over 600,000 dentures supplying molars and bicuspids in the lower jaw, constructed every year. This estimate is based on replies answering a questionnaire sent to general practitioners in every state in the union, and to our largest dental laboratories. The questions asked and the replies received were as follows:

Question. How many cases supplying the teeth posterior to the lower first or second bicuspids did you make last year? The average is about fifteen.

Answers vary from three to thirty-five. The laboratory men estimate sixteen. There are about 45,000 dentists making a total well over 600,000.

Question. What kind of attachments do you use?

Answer. Cast clasps, wire clasps (half round, round, flattened and contoured). Dresch, Roach (Ball and Flat) Boos, Supples, Bremmer, Gilmore, Piston and Cylinder (Nichols and Stansbury). There are others but these are the ones named in the answers received. How many of us are familiar with all these attachments? We ought to know about them. About ninety per cent use the cast clasp or the wire clasp—they are about equally popular. The other ten per cent or about 6,000 are constructed with special attachments.

Question. What kind of lingual bars do you use?

Answer. About forty per cent are ready-made, forty per cent are formed from wire and 20 per cent are cast.

Question. How do you make your impressions?

Answer. About twenty per cent use modeling compound, sixty per cent compound and plaster and twenty per cent plaster.

Question. How do you take the bite or register central occlusion?

Answer. Many different methods are used but our laboratories report about seventy per cent use a biscuit or mash bite. One large institution says twenty-five per cent are bees wax bites (which must be of doubtful accuracy). Some men use base plates, compound, piano wire bars, set up teeth in the mouth, etc. Dr. Stanley Smith of Cincinnati has a special bite tray he recommends.

Question. What do you use for casts?

Answer. Healy's, Spence's, Weinstein's, Austin's, Monson's, Plastone, Detroit Artificial Stone, Brophy's, Ransom and Randolph's Stones, Snow White Plaster, and French's Plaster. Healey's and Spence's Compound are the most popular. The laboratories report over sixty-five per cent of the dentists are still using plaster. They recommend artificial stone.

Question. What percentage of your cases do you rebase? This most important operation is almost entirely neglected. Very few men rebase their lingual bar cases. Nearly *every* case *should* be rebased, whether it is made of gold or vulcanite and whether the extraction has been recent or not. There is no doubt but that much harm is done to

abutment teeth by not compensating for the absorption that *always* takes place under the small saddle pieces of such an pliance soon after it is made, if the patient has not previously worn one. Impaired function caused by this condition is very common.

Answer. One large laboratory says: "dentists try to avoid it." Another rebases one per cent, another says "very seldom." Among the answers from dentists, we find "very few" "in early extractions," "none," "try to rebase all within a year," "eighty per cent, fifty per cent, twenty-five per cent, ten per cent, five per cent."

Among the recent devices recommended for these cases, we find the piston and cylinder idea, proposed by Ira Nichols of Mandan, North Dakota, and improved by Claude Stansbury, of Seattle. This is a double bar, the lower one carrying pistons that fit into cylinder on the upper bar. This appliance allows movement in the direction of masticating force, compensating for compression of the movable tissue without applying force to abutment teeth. Dr. Nichols will show this appliance in our clinic.

In literature describing the Dresch attachment we find these statements:

The retaining agent should not transmit masticating forces to the abutment.

The retaining agent should be practically immovable on the abutment.

The denture should rest slightly on the tissue when at rest and not interfere with circulation.

Claims by Dresch for his attachment:

Abutment teeth are not called upon to carry stress.

The clasp is stationary; it does not move up or pull on the tooth.

Insertion and removal are easily accomplished without binding.

The grasshopper principle is used by some men and undoubtedly has advantages over rigid constructions.

Quoting from Dr. Cummer's Paper on "Theory and Practice of Partial Denture Service;" these dentures should not be worn at night; clean them five times a day; call in for periodic examination.

He suggests the following problems: The study of clasp design with a view of eliminating leverage; study of the support of partial dentures and loading; a gnatho-dynamometer for measuring stress; mandibular movements and articulators.

E. E. Bailey, in a paper given in Boston in 1920, says: "clinical experience has taught the writer that partial dentures which will limit atrophy of the alveolar structure and give maximum masticatory function, and not prematurely destroy the remaining teeth, can be produced, only by a balanced effort between alveolar ridge and abutment teeth, thereby producing maximum support."

We have a case submitted by Drs. Brenner and Trigg, of Milwaukee, which has no direct attachment to the teeth, for which they claim: Ample stability in function; normal proximal contact with the remaining natural teeth; possible tissue stimulation; and wide range of adaptability.

It would take a long time to go into the many phases of this appliance but I hope I have demonstrated the importance of this subject and that the officers of the section should appoint a special committee who will divide up the work of systematic investigation of every method and report before this section next year.

MOUTH SEPSIS IN RELATION TO SCHOOL PROGRESS

By HARRY B. BUTLER, (Surgeon R) U.S.P.H.S., Washington, D. C.

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

THE Oral Hygiene Unit of the United States Public Health Service was organized September 1, 1919, for the purpose of making investigations as to the oral conditions existing among the children of the United States, to carry on educational activities, to conduct scientific research in its own particular field and to aid such states as showed interest in child hygiene by cooperating with their state departments of health. The Unit is not a part of the dental section of the service but functions through the child hygiene section of the division of scientific research. An officer and an instructor, the latter a specially trained dental hygienist, comprise its personnel.

During its tours of duty the unit has visited the states of West Virginia, Virginia, Delaware, Tennessee, Mississippi and Florida.

The Unit is always referred to as a health or a hygiene unit rather than a dental unit for two reasons; first, its main object is the conservation of the health of the child, and, secondly, it has been found by experience that if it be so termed it is an easier matter to interest the people.

The Unit is assigned to some state by the department upon request of the state's department of health with which body it confers upon arrival and a general itinerary is planned which will insure its visiting the more active and progressive communities of the state. Naturally, there being but one such unit in the Service, up to the present, the stay in any one state must be limited and, being a Federal unit, no expense is incurred by any community or by any department of education supervising such schools as may become the fields of the Unit's activities.

Upon arrival in a community contact is made with the educational authorities and some school selected by them for the Unit's principal demonstration. The pupils are met assembled for the purpose of addresses suitable to the age of the group at which time oral hygiene is discussed, the object of the visit is explained and a general outline of the program to be given is stated.

After meeting the pupils a survey is begun for the purpose of revealing actual existing conditions. These surveys vary in extent. In one instance it included every pupil in attendance at all the schools of a county, in others it has been limited to a few grades. In making these surveys the regular government chart is used. This chart was devised by the Unit and is most complete. By its use a comprehensive mouth picture is obtained and provisions have been made by which, if so desired, annual examinations and a complete dental record for the entire eight years of the child's pre-

high-school life may be kept upon a single chart. These charts become a part of the government record, are returned to the department and in the hands of the statisticians reveal much valuable information. The findings, however, are available to such local agencies as may be interested and entitled to them.

After this survey has been in progress a short time, revealing cases of marked gingival infection, the clinical equipment is set up at some convenient point and from this time on, during the stay of the Unit, the clinic and the survey may be said to run continuously, cases of gingival infection becoming clinical material for study.

The clinical equipment is such as to be ready for any operation in emergency but, being a hygiene unit rather than a dental unit, extractions and restorations are seldom undertaken and then only in emergency and upon request. This equipment is of the army field type familiar to those who saw service in the recent European war.

One difference between the work of the Unit and that of general practice will at once be apparent. The private office waits for the child to come to the practitioner, the Unit carries the work to the child and in so doing sees many cases not met with in the average practice. To make proper record of these cases the Unit employs the camera but, as is easily understood, the camera largely fails when portrayal of intraoral areas is desired. In these cases the Unit resorts to water color and an interesting portfolio of these records has been obtained. These have been reproduced in colored slides, have become a part of the Department's lantern slide library and are available under certain conditions.

The toothbrush drill is featured in the grades. This activity is so conducted as to insure the proficiency of a well organized squad capable of conducting the drill after the Unit's departure and plans have been formulated by the employment of which a solution of the school's oral problem is largely accomplished at no expense to either school or community. A catechism embodying the essentials of oral hygiene, as taught by the Unit, is left with the squad captain and in one section visited, these questions and answers became a part of the regular examination for promotion in every school in the county.

The importance of teaching hygiene to children at the earliest possible age is conceded to be of utmost importance. To successfully accomplish this, however, proves a problem as those who find themselves facing it can testify. The solution, for the Unit's purposes, has been successfully worked out by the writing of a story in which many hygienic measures are personified. This story has become an important part of the Unit's program. It was early observed that children learn quickly from other children and advantage is taken of this point in the following manner; a curly blonde wig, a child's middy suit, socks, sandals and theatrical cosmetics convert the instructor of the Unit into a twelve-year old girl who thus costumed, tells the story most effectively. So successful is this transformation that neither child nor adult has ever penetrated the masquerade as certain prominent members of the profession may be persuaded to admit upon proper pressure.

Interesting the people at large in oral hygiene is also a matter given much attention. Seldom a week passes without Rotary or Kiwanis being addressed upon invitation and chambers of commerce and women's clubs receive the work with marked approbation.

To close a week's program the Unit carries the two-reel feature film, "Come

Clean." Most of the profession have seen or heard of this film and it proves a most effective closing of a week's activities. When proper projection is not available in the school auditorium local theatres prove most willing to allow the use of the house, the school children attending in a body.

With chief interest in the health and mental efficiency of the individual, rather than in the teeth alone, and with the able work of Dr. Ebersole and Dr. Fones in mind, the Unit conceived the idea of finding some method of estimating the degree of infection to be found in the mouth of an individual and expressing such findings in the convenient terms of percentage by means of which comparisons might be made between the mouth condition of the individual and his health or scholarship records. This proved a serious task but eventually a system was devised and submitted to a number of men prominent in the Dental world for their criticism or suggestion. As in each case it was returned with approval and without suggested change it was adopted by the Unit as the basis of their investigation.

The general idea was to consider every oral condition found which might contribute to the bacterial content per given unit of saliva and, assuming a mouth to be free from all obvious infection, its septic index would find expression as one hundred per cent.

The gingival tissues were conceded to be of the most importance in point of bacterial contribution and to these tissues were allotted forty of the one hundred per cent. A severe case of pyorrhea, gingivitis or Vincents Angina would indicate a loss of the entire forty per cent in estimating the degree of infection found in the case. Cases of less severity would cause demerits as might be indicated, five, ten, or twenty per cent.

The coated tongue was viewed as a field covered with a dense bacterial growth and to this condition was allotted ten of the one hundred per cent. Heavily furred tongues would be demerited the entire ten points allotted to the tongue. A clear tongue would be allowed the entire ten points with a demerit corresponding to the degree of departure from normal if such be found.

Stains were considered as evidence of bacterial growth and to stains were allotted ten points also, demerits to be made in manner similar to those made expressing the degree of furring found upon the tongue.

To calculus there was also allotted ten per cent. Varying, as it does, from simple salivary calculus upon the lingual aspect of the lower incisors to the deep-seated serumal desposit, it would at first appear that an insufficient proportion of the one hundred per cent had been allotted. It will be seen, upon reflection, that had the latter resulted in some pathological manifestation in the gingival tissues that the resulting condition would have been indicated when considering the condition under the heading of gingivae.

Dental caries was a matter not as easily disposed of. To caries was allotted the remaining thirty points of the one hundred per cent with demerits as follows:

For a simple cavity in a deciduous tooth	1
The same, but involving pulp chamber	3
For a simple cavity in a permanent tooth	3
The same, if involving pulp chamber	5
Fistulae	15

(Teeth appearing as broken down roots are considered as caries involving the pulp chamber. Only obvious cavities considered.)

Assume a case to present itself with moderate salivary deposits, slight gingival infection resulting therefrom, tongue clear, stains slight and simple cavities

in two first molars. The septic index of the mouth would be found as follows:

Gums	40	minus 8	32
Calculus	10	minus 5	5
Tongue	10	minus 0	10
Stains	10	minus 3	7
Caries	30	minus 6	24
Percentage of case			78

Giving a case its proper rating becomes a simple matter, one minute suffices in the average instance and the system has been the basis upon which many interesting observations have been made.

It was first employed in the following manner. A group of 80 children had been examined and their mouth grade noted in each case and a list of the ten showing the best scholarship in the group was secured from the teachers, together with a similar list showing the ten with lowest records in scholarship. The average mouth grade of these two groups was then taken and appeared as follows: High grade pupils, mouth grade, 89.75 per cent; low grade pupils, mouth grade, 66.6 per cent. This same group was then the basis of another comparison. The ten children whose mouths showed the highest mouth rates and the ten with the lowest mouth rates were selected and averages of the scholarship of the two groups were taken. The group with the highest mouth rate showed an average scholarship of 83.4 per cent, while the low mouth rate group showed average scholarship of 72.33 per cent.

Another group of 160 children having been examined and their mouth grades noted was divided into three sections, those grading below 80 per cent, those grading 80 to 90, and those 90 and above. The record of these sections and the average school grade of each is as follows: 70 group, average scholarship, 71.2 per cent; 80 group, average scholarship, 82.5 per cent; 90 group, average scholarship, 89.7 per cent. This same group of children, divided into similar sections according to their scholarship, furnished the following record:

70 group, average mouth rate, 73.9 per cent; 80 group, average mouth rate, 87.3 per cent; 90 group, average mouth rate, 93.4 per cent.

It will be noted that in these comparisons between the mouth grades and scholarship grades no consideration of other than oral conditions existing has been taken. The comparisons have been made some thirty times and in no instance has the apparent relation failed to be shown. The groups have varied from a single grade to a group of 1000. In no case was the scholarship known to the Unit when giving a mouth grade nor was the mouth grade known by the teachers in their estimate of the individual scholarships.

From a group of 1000 children which had been examined there were selected 325 who had been found to have no defects other than oral. These children were divided into sections as in the above experiment with the following result: Grouped by scholarship—70 group, average mouth rate, 80 per cent; 80 group, average mouth rate, 84.4 per cent; 90 group, average mouth rate, 89.3 per cent.

Grouped by mouth grade—70 group, average school grade, 75.8 per cent; 80 group, average school grade, 82 per cent; 90 group, average school grade, 87.5 per cent.

Among 786 children examined by the same agency and grouped according to their mouth grades the Unit found as follows: Of the 70 per cent group, 48 per cent had enlarged submaxillary glands; of the 80 per cent group, 46.2 per cent had the same defect; of the 90 per cent group, 41.2 per cent had the defect.

Three groups of children from two different communities, having been regu-

larly examined by the school physicians who made records of their tonsil conditions, were given mouth grades by the unit and the tonsil records afterward obtained revealing the following data:

First group, 83 pupils, junior high school: Those with infected tonsils graded 70.2 per cent in mouth grade, those with normal tonsils rated at 84 per cent.

Second group, 84 children, first and second grade: Those with infected tonsils graded 73.2 per cent in mouth grade, those with normal tonsils rated at 81 per cent.

Third group, 55 pupils, 7th and 8th grades: Those with infected tonsils, average mouth grade 79.4 per cent; those with normal tonsils, average mouth grade, 89.2 per cent.

Finding an eighth grade of some 208 children who had been weighed and measured the previous week, the opportunity was taken to make comparisons between the weight records of those having a marked gingival infection and those with normal or near normal gingivae. In making the comparisons a pupil falling more than seven pounds below normal weight was classed as underweight while one more than seven pounds above normal weight was classed as overweight, the findings may be expressed thus:

With Marked Gingivitis

Underweight	57.0 per cent
Normal	30.7 per cent
Overweight	12.3 per cent
	100 per cent

With Normal Gingivae

Underweight	36.4 per cent
Normal	47.7 per cent
Overweight	17.7 per cent
	100 per cent

Further investigations in similar lines are being made by the Unit.

The averages of all groups selected as bright and slow by their teachers are as follows: (629 children).

Bright group—average scholarship, 89.8; average mouth index, 88.7. Slow group—average scholarship, 71.1; average mouth index, 71.8.

The averages of all groups classified as 70, 80 and 90 groups, some 894 pupils, are as follows:

Grouped by scholarship—70 group, mouth index for group, 71.7; 80 group, mouth index for group, 83.5; 90 group, mouth index for group, 90.4.

Grouped by mouth index—70 group, average scholarship, 75.6; 80 group, average scholarship, 83.2; 90 group, average scholarship, 89.9.

In a group of 759 children who had had complete physical examination, including oral, there were found to be 285 who had no physical defects recorded and whose mouths averaged 80 per cent or above. In this same group of children 90 were found whose mouths rated below 80 per cent but who had no other physical defect. The average scholarship of these two groups was found to be as follows:

Those with mouths rating 80 per cent or above and without other defects. scholarship average 85.0.

Those with mouths rating below 80 per cent but with no other defect, scholarship average 76.1.

629 Pupils Grouped as Bright and Slow by Their Teachers

Bright group scholarship average	89.8
Mouth index	88.7
Slow group scholarship average	71.7
Mouth index	71.8

894 Pupils Divided Into 70, 80 and 90 Classes by Scholarship Records

Mouth index,	
70 class	71.7
80 class	83.5
90 class	90.4

Same Group Divided Into Similar Classes by Mouth Index

70 class	75.6
80 class	83.2
90 class	89.9

Further investigations in similar lines are being made by the Unit.

Discussion

Wm. H. Card, Minneapolis, Minnesota: The very first point that wins attention in this paper is the splendid method of mouth grading. It is doubtful if it could be improved. The second thought however is that while Dr. Butler shows that low mouth grade and low scholarship grade go hand in hand, the real scientific value of the experiment was lost and most of the time spent in examination wasted, unless follow-up mouth and scholarship gradings were made after these children had thorough prophylactic treatments and repair, had their mouths gradually restored to as nearly 100 per cent grade as possible, noting whether there was a corresponding ratio of improvement in scholarship.

It would be interesting to know what part malocclusion played in the mouth sepsis of these groups. In our examinations of nearly 40,000 Minnesota rural school children, from ten to as high as thirty-five per cent in some communities have malocclusion, a large proportion of which comes under Class 2 and Class 3 Angles classification due to adenoids and bad tonsils. Dr. Butler mentions but six infected tonsil cases out of all examined, and not any adenoid or mouth breathing cases. In all three classifications, the gingival conditions are always found to be bad. which would lower the mouth grade considerably under this method, and doubtless the school grade.

It would also be interesting to know the diet of the slow scholars particularly of group 6 from Murfreesboro, Tennessee; this group having a mouth average of 58.3 per cent the lowest grade of all examined, though the scholarship average is 73.9 per cent; also of group fourteen the lowest school average group 62 per cent, yet a mouth average of 77.7 per cent.

In the mining towns of Minnesota the very worst mouth conditions are found among children whose diet three times a day consists of coffee, white bread, and pork, if they have meat at all. These children mostly of foreign born parents, who in their own country ate the good wholesome "dark" breads, but find our highly milled and de-mineralized white breads like cake to their palates and they and their children are showing mouth conditions as a result that are appalling. Scholarship among the children is correspondingly low.

This fall at the Minnesota State Fair, the Oral Hygiene Committee of the Minnesota State Dental Association is directing a prize contest for the most perfect and best kept mouths, and a large number of cash prizes are to be given. This is a new departure in Minnesota and is for the purpose of stimulating the interest of the children themselves in mouth hygiene.

THE IMPORTANCE OF A PROFILE RECORD OF PROSPECTIVE DENTURE PATIENTS, BASED ON NATURE'S PLAN

By E. LESLIE EAMES, D.D.S., Los Angeles, California

(Read before the National Society of Denture Prosthetists, Los Angeles, California, August, 1922)

NATURE erupted four permanent molars for each of us at the age of six years. These molars have prominent cusps and deep sulci. Those of the mandible to meet and interlock cusps with those of the maxilla.

One of the most important functions of these teeth is to retain a harmonious relationship of the mandible while nature throws off the deciduous teeth and the permanent ones are erupted in their places, (Fig. 1). But nature never intended that we should wear artificial dentures, and no provision has ever been made by her for the retention of the harmonious relationship of the mandible while the permanent teeth are being extracted and the artificial ones constructed and inserted in their place.

So in obtaining a negative profile, we are only carrying nature's plan forward, and providing a means whereby we can positively restore the mandible to its former functional relationship.

Profiles may be obtained by many different methods, but the technic I have found to be most easily executed, giving the least discomfort to the patient, and at the same time providing a suitable profile record convenient for filing, is obtained in the following manner:

The necessary materials and instruments are: A soft pine board, 12 inches by 7 inches; cardboard, convenient size for filing; iron wire, No. 16 gauge; thumb tacks; a pair of pliers and scissors.

TECHNIC

Iron wire of suitable length is used, a small loop being made on one end, (Fig. 2). The wire is then contoured with hands and pliers to fit as accurately as possible the profile, beginning with the loop at the superior border of the forehead and ending underneath the chin, about two inches posteriorly. Here the wire is cut and another loop is made in this end. The cardboard is then placed on the soft pine board, the wire profile adjusted and thumb tacks inserted in the loops. Following the wire with a pencil we have a record on the cardboard. This is only approximately correct. The wire is then removed from the board and placed on the profile of the patient and discrepencies noted and corrections shaded in on the cardboard. The corrected profile is now cut out with scissors and its accuracy checked up on the patient.

We have now a suitable record whereby we are able to restore the former functional relationship of the mandible at the time of establishing the bite. This record will also prove of use at a later

date when resorption has taken place, enabling us to restore the mandible to harmony by refitting the dentures.

This profile gives us the positive relationship of the chin to the end of the nose, which carries with it all the harmonious relationships existing in the mouth, where the mandible is concerned, namely:

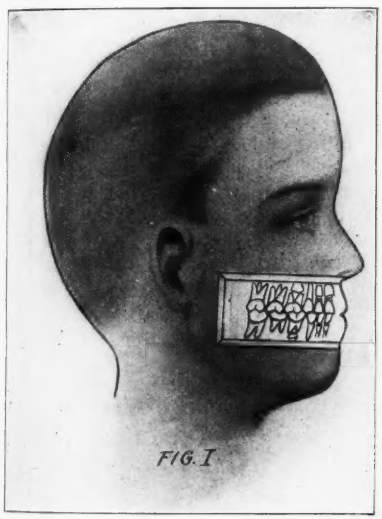


Fig. 1

An Accurate Relationship of the Mandible to the Maxilla

A harmonious working of the muscles of mastication, which is a condition that has been brought about by use throughout the life of the individual, and in this connection I firmly believe that the retaining of nature's established harmony in the function of these muscles, is most conducive to the peripheral comfort and stability of a new denture, as well as a great addition to the pressure power the patient is able to exert when bringing the masticatory surface of the dentures into working contact. Here we might ask ourselves the question "How much would we cut down the efficiency and esthetics of a case if we caused the muscles of mastication to draw the mandible occlusally, say one-fourth of an

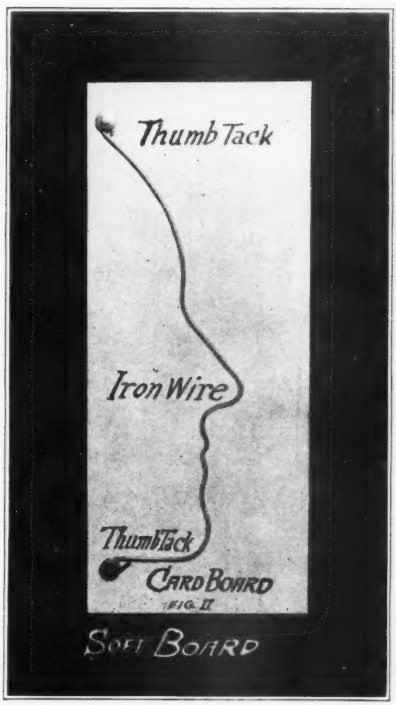


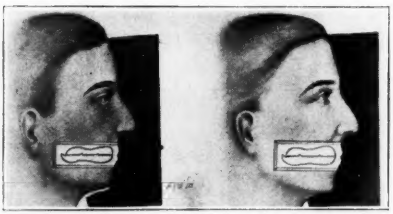
Fig. 2

inch farther than it had ever been drawn before throughout the life of the patient, in order to bring the occlusal surfaces of the denture or dentures into working contact?" To say the least, I feel we would add a great discomfort to the patient, as well as the additional burden of wearing an artificial denture.

The positive relationship of the chin to the nose also carries with it a har-

monious relationship of the condyles in the glenoid fossae, (Fig. 3).

Some two years ago, at the Boston meeting, some cures of deafness were reported, by the proper construction of artificial dentures, and in passing I may say that if the deafness was cured by the dentures, properly constructed, then the deafness must have been caused by an inharmonious relationship of the condyles in the glenoid fossae, therefore, by retaining and reproducing a harmonious relationship we will avoid contributing to that ailment—deafness.



a b

Fig. 3—(a) Incorrect. Chin fails to fill the negative profile, taken before the removal of the teeth. (b) Correct. Bite opened—chin fills negative profile, taken before the removal of the teeth.

When the teeth are once lost, it is impossible to again obtain the positive relationship of chin and nose, for it cannot be reproduced by the patient's memory plus your memory and skill, without a previous record.

In conclusion I would say that in order for us to bring about the highest degree in esthetic results in denture restoration we must do all in our power to interpret nature's plan and in reestablishing artificially a normal relationship, our greatest degree of perfection will be achieved when we make a study of each individual case.

HAS GOLD FOIL EARNED A PLACE AMONG OUR FILLING MATERIALS?

By JAMES MARK PRIME, D.D.S., Omaha, Nebraska

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

THIS is a day of substitution. It is a difficult task to get the genuine article. Good things are imitated and substituted so often that one must be an expert to detect the imitation from the genuine. In the old days to buy a wagon was to get a good job—assured of good material and workmanship. A piece of silk was silk, a piece of woolen cloth was made of wool, a pair of boots of leather—real leather.

In this day of substitution when the opinions of dental operators are so at variance—their ideas so scrambled—I wish I could cry out for gold foil as "a voice crying in the wilderness." For a veritable wilderness it is. With the multiplicity of processes, theories, methods and technics, we are likely to find operators confused, and not sure of the best and safest lines to follow. No doubt some of the so-called modern and improved methods will briefly pass and leave us regretting the experiments we made on our trustful patients.

How long will operators preserve their

CLASSIFICATION OF FILLINGS[1]

	Gold Foil	Gold Inlay	Amalgam	Silicious Cement	Total
Incisors and Cuspids					
Proximal	2792	691	33	2338	5854
Gingival third	805	294	55	591	1745
Bicuspids					
Occlusal	444	188	279	25	936
Mesioclusal	490	627	366	74	1557
Distoclusal	690	1242	1057	19	3008
Mesiodistoclusal	148	873	218	4	1243
Gingival third	332	179	233	141	888
Molars					
Occlusal	846	695	2530	22	4093
Mesioclusal	511	1558	1684	10	3763
Distoclusal	164	983	1466		2613
Mesiodistoclusal	27	824	336	2	1189
Gingival third	227	213	1366	37	1843
Totals	7476	8367	9623	3263	28,729
Percentages	26	29.1	33.5	11.4	100

[1]James Mark Prime, "Relative Merits of Our Principle Filling Materials," *Journal National Dental Association*, Vol. IX, (1922), No. 1, p. 15.

self-respect and the confidence of their clientele, who persist in removing good gold-foil fillings, still in excellent condition after years of usefulness, and replace them with a temporary silicious cement? Such dentistry paves the way rapidly to a crown, a bridge or a plate.

In the preparation of an essay along this line to be read before the Chicago Dental Society, we wrote to fifty operators in widely separated parts of the United States, asking them to tabulate their last one thousand fillings, the material from which they were made and the location of the cavities. We received tabulations of 28,729 fillings. We requested reports on four materials only, gold foil, cast gold inlay, amalgam and silicious cements. The tabulations do not include operations in deciduous teeth, inlay abutments for bridges, pit cavities in buccal surfaces of molars or extensive cavities involving almost the entire crown.

On the foregoing page is given a summary of the classification of fillings.

These tabulations show a higher percentage of gold foil than would be the average. Requests were made from members of two gold foil study clubs, yet, the average for 28,729 filling operations was only twenty-six per cent. Three offices reported no gold-foil fillings. Another made but four. A few others made less than one hundred. Six gave reports close to fifty per cent. In two offices this was the only form of gold filling used. If reports could be secured from all offices in the United States the average for gold foil would be very low indeed. After studying our tabulation we would say that a well balanced practice should have thirty-five per cent of its operations in gold foil, thirty-five per cent cast inlay, fifteen per cent amalgam, leaving fifteen per cent for all other materials. This is not including operations in diciduous teeth.

We wrote to the largest gold manufacturers asking them if their sales in gold foil were increasing or diminishing. Their replies were encouraging, indicating sales both in gold foil and instruments used in gold-foil work, were increasing. We wish it might be much greater.

After that paper was published in the *Journal of the National Dental Association,* many letters were received. Some were commendatory and others critical. To quote from a critic—"To make a malleted gold-filling today in the light of what we know would be like driving a team of oxen to town when we had a new limousine in the garage." I think the above statement represents the opinion of too many men today on this very important subject.

The excuse that patients will not endure the malleting does not hold good as evidenced by the statements of hundreds of operators all over the country using both the gold foil and the inlay. Our own experience bears out the fact that patients are both willing and anxious for those operations which promise the greatest number of years of usefulness. Show me a man who has full faith in the gold-foil operation, and the ability to make it, and I will show you a man whose patients very rarely object.

An opinion very generally prevails throughout the profession that the gold-foil filling, where indicated, is the best operation known. The disposition not to make it is very nearly as widespread. Is it from lack of ability? If so, are we to continue our boast of progress? What answer shall we make when leading men in the profession will say: "I haven't made a gold-foil operation since I left college;" "A roll of rubberdam will last me six months;" "My patients will not endure it;" "I know it is better but it is too difficult;" etc. Why this condition? Are the colleges training the students to understand the manipulation of gold foil and are they requiring them to not only become skilled in its

use but to do it until the work becomes fascinating?

Is an interest, such as it merits, manifested in the organization of gold-foil study clubs? Of how many gold-foil study clubs do you know? Has commercialism, the common enemy to the higher conscience, been a factor? Are the instructors in inlay classes sufficiently skilled in gold-foil work so that, by personal experience, they become competent witnesses to bear testimony and substantiate their claims for the excellency of the inlay over gold foil?

Have the substitutes for gold foil had enough of that one supreme test, the test of time, by which all things are measured and before whose bar they must stand or fall?

A college not fully provided with competent gold-foil demonstrators should never be graded among our high-class schools. Training the student in the management of gold foil not only qualifies him to properly use this material, but raises his manipulative skill and prepares him for other more highly complicated technical procedures.

We hear arguments claiming the inlay can be made in so much less time. To throw a little light on this point, as results of work in our office, my secretary has gone over our records and selected fifty inlays in bicuspids and molars. Also the same number of gold-foil fillings in the *same class* of cavities. Practically all the inlays were made by the indirect method. Laboratory time includes investing the wax pattern, but does not include burning out. The average time for the fifty inlays was two hours and fifty-one minutes. The average time for the fifty gold foils was one hour and fifty-four minutes.

It is a well-understood fact that cavities prepared for inlays require more time and attention than is necessary for gold foil or the plastics. All undercuts must be filled with cement, or some other material, or the cavity wall must be extended by cutting until the undercut is removed. This requires, as you well understand, time and attention. If cement is used to fill the undercuts, a few minutes of waiting is necessary for the crystallization. How often have we thought we had the cavity prepared so the wax, or the compound impression would draw, and discovered when we undertook to remove our materials that they would not do so without breakage or distortion. If slight irregularities exist in the walls of cavities (which do not undermine the enamel) they may be considered advantageous, if the cavity is to be filled with gold foil. These slight irregularities lend stability and firmness to the operation.

Let me emphasize the statement that we do not believe gold foil should be employed in large distoclusal or mesiodistoclusal cavities in the molar teeth. Indeed, many cavities in the bicuspids may be more advantageously filled with inlays. We do, however, unhesitatingly say, in those cavities where it is indicated a more enduring operation may be made with gold foil than any other material known today.

A gold-foil operation properly made is our best filling. If carelessly made it is the poorest. It requires sufficient time for good cavity preparation and a careful management of the foil from the beginning until the operation is completed. It never appeals to the slothful, lazy man. The gold-foil operator labors constantly between the two extremes, one to sufficiently condense the gold to keep the specific gravity at fifteen or over. It does not require heavy malleting to get this density. The other is to avoid wedging the gold so strongly against the cavity walls as to fracture them. Between these two extremes he must work and correlate his stepping of the plugger with a line of force to secure thorough adaptation to the cavity walls and also a

gripping on the filling by these walls. It must be remembered that we are expanding the dentin, which is a highly elastic material, overlaid with a nonelastic enamel. If the dentin is overexpanded the enamel will show checking because the enamel cannot expand. After the foil is placed and the filling built to form, the finishing process is one requiring careful attention. Trimming out the surplus of gold at the gingival must be accomplished in such a manner as not to injure the septal tissue. The proximal surface must be trimmed and finished to natural form leaving a rounded marble contact, never a flattened surface. Should the operation be one restoring part of the occlusal surface, this must be finished to true anatomical form, with no rough overlapping margins. The whole operation must be made extremely smooth and perfectly flush with the enamel surfaces, at the same time faithfully restoring the natural forms of the teeth. The habit of filling cavities overfull and then grinding the surplus out with stones and other instruments is a very wrong procedure, entailing much loss of time to say nothing of the discomfort to the patient. The tooth form should be restored with the plugger, with a surplus over the margins only. If we fail to properly finish the occlusal portion by allowing rough and overcovered margins to remain, we are inviting early recurrence of caries. If the proximal surface is left rough, debris will accumulate and plaques will form, which will attack the enamel of the approximating tooth. If the gingival portion is left improperly trimmed and polished an inflammatory condition of the gingival tissues follow. This is easily observed in labiogingival and buccogingival fillings where the gingival tissues continue inflammed and swollen. Upon close examination a roughness will be discovered. Here is a difficult place to get a perfectly polished and finished margin and to accomplish this it is advisable to cut the gum tissue well away, exposing the cavity plainly to view before the dam is adjusted. This finishing does not apply to gold foil alone, but to other materials as well.

In any procedure whereby any part of the masticatory surface is restored, the final adjustment cannot be secured at that time. The patient is asked to close the teeth in occlusion. The restoration may be adjusted to comfort, but that only registers one position of the mandible and that is a *conscious* one. The movement of the mandible in function is an unconscious act and the patient must be asked to return so that the restoration may be trimmed and adjusted as evidenced by the markings from unconscious usage. If this is not properly done the teeth must make their own adjustment with a probable injury to the periodontal membrane, causing a possible disarrangement of contact relationship, and further the tooth or teeth will most likely become lame. We cannot stress this too strongly; it does not apply to gold-foil operations alone, but to all cases where the occlusal surface is involved and most particularly must the method be adhered to in bridgework. This is an objection to restoring occlusal surfaces with porcelain because the markings from use do not show on porcelain.

Gold foil offers a material with which the cavity may be entirely filled, no part of which can be affected by the secretions of the mouth. It is the only material known, which, when placed tightly within the cavity walls, will continue indefinitely in this condition. There is nothing better in its protection to enamel margins. It is the only material with which, by wedging against the aproximating tooth, a limited amount of separation may be secured as the filling is built. It holds first place from the standpoint of near-surgical cleanliness. With the dam in place the cavity is prepared in a most

cleanly manner, and freshly heated, sterile gold is wedged securely against these walls, sealing them against the entrance of moisture for an anticipated time longer than any other material known.

When operating on vital teeth we should never lose sight of the fact that we are building against living vital walls. The dentinal portion of our walls contain innumerable fibrils, the ends of which have been cut, exposing living protoplasmic cells. Evidences are abundant that changes, perhaps chemical and possibly structural, take place in these cells when exposed to irritants. When cavities are cut and allowed to go unfilled for a time, even though stopped with guttapercha or cements, a highly sensitive condition usually develops. It is good surgery, therefore, to close these broken fibril ends as quickly and cleanly and permanently as possible.

Is not the theory borne out by the clinical facts, that gold foil most nearly meets the requirements? It is the material least inclined to tooth discoloration. It is the one material capable of being wedged between the elastic walls, and, by these walls, continually gripped and firmly held. The expansion or contraction of the gold under heat and cold has no effect whatever, and as vital dentin has about 40 per cent more elasticity than malleted pure gold, it maintains, under all conditions, a firm grip upon the filling. It is this principle which preserves the excellent adaptation of the filling to the walls of the cavity.

In brief, gold foil, as Dr. Black has told us, possesses in much the greatest degree those first essentials to a permanent filling material. Gold foil is the one ideal material for filling the little depressions on the occlusal surfaces of the teeth caused by abrasion and erosion. A small filling is made in these spots as soon as they appear, preventing to a great degree further loss of tooth structure from these causes. No material is so admirably adapted to filling fissure cavities in the occlusal surfaces of the teeth. These fissures may be followed out with small inverted cone burs, size 33½, trimming the enamel walls by very slight planing with the chisel, the result being an ideal operation with little tooth structure lost. We do not subscribe to the theory that almost the entire occlusal surface of a bicuspid or molar must be cut away by connecting several small cavities. Each cavity should be prepared and filled separately and never more cutting done than is absolutely necessary.

The chisel may be a dangerous instrument in preparing the occlusal step in cavities. If large portions of the enamel are broken away at one thrust, the inclination of the rods are such as to cause undesirable extension. This, we think is perhaps responsible for the many cases seen where the occlusal step is cut dangerously deep and unnecessarily wide. The use of the chisel is not condemned for this purpose. It should, however, be very sharp and used with a planing motion, removing the rods in powder rather than in large pieces. This extension may be safely made with plain fissure burs.

Soft, unannealed gold may be used to great advantage in getting better adaptation in the gingival third of proximal cavities in bicuspids and molars and on pulpal walls. It makes the operation shorter because the soft gold may be placed and condensed much more rapidly than the cohesive. By reason of its soft easy-cutting properties it greatly facilitates finishing when used in the gingival third of proximal cavities in bicuspids and molars.

It is not our purpose to go deeply into the technic. All are familiar with Dr. Black's masterly work on this subject. Long years in the use and study of this

material, we hope, may justify these brief suggestions.

Dr. Black has been greatly misunderstood in his cavity preparation. He does not advocate deep cutting.[2] I believe vital teeth are being cut, by most operators, entirely too much. I also deplore the over-cutting observed in many cases of the so-called Carmichael and three-quarter crown preparations. We will all agree that whatever filling material we may use our cavities must be made with the least possible cutting of vital tooth tissue. We know we must extend for prevention. After that is secured our cutting must be most cautious and careful.

Most of the instruments for preparing our cavities are too big and clumsy, having too much stock at the cutting edges.

We are justified many times in leaving some enamel on the pulpal wall, provided however, our filling has enough material to get the necessary strength. It is not required to have a large mass of material in the step portion of our cavity. Have you observed many failures in gold-foil fillings, or inlays, where the step portion has broken away from the main portion? We hear the objection made that gold cannot be adapted to the remaining enamel on the pulpal wall. If a pulpal wall has some remaining enamel and is, therefore, made up of enamel and dentin, have we not an analagous condition to all other walls, save the axial? Can you imagine a cavity where we do not adapt gold foil to enamel? Enamel is the natural covering for dentin, and wherever some, in safety, may be left, I should say it is desirable. I would even go further. If conditions admit enough bulk of material to secure the required strength this extension may be safely laid entirely within the enamel. The day for making wide and deep gingival and pulpal walls is past. The dental pulp has priority—it is "eminent domain" and all things else become a secondary consideration.

We advise against the careless use of the ligature. Do not pass it over the contact point with too much force. It cuts and injures the septal tissues. Only rarely is it necessary to ligate a tooth under the dam. The dam may be retained by simply inverting its perforated edges around the tooth or teeth. If a tooth is ligated tightly for any length

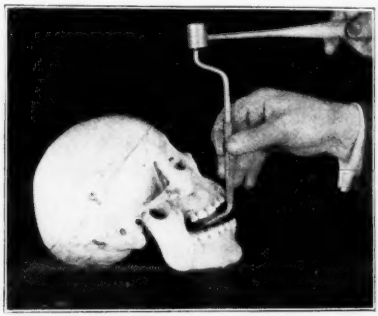


Fig. 1

of time injury almost always results to the gingival tissues.

We find but limited use for the once popular cylinder. The soft pliable unannealed pellets lend themselves much more admirably to irregularities in cavity walls. Where decay has carried our cavity pulpward more than we desire how lovely these soft pellets heal the not-flattened nor fully-squared walls. Let us imagine a simple occlusal cavity in a lower first molar. Decay has progressed well past the dentoenamel junction. To square our pulpal with our other walls would be to weaken the walls and endanger the pulp. The filling is started with the large pellets unannealed and condensed with the Nos. 2 and 3 of the balanced gold pluggers, Figure 1, and quicker than it takes to tell it, it is filled to the point where we begin to build

[2]Black's Operative Dentistry, Vol. XI, p. 145.

our toothform with the small annealed pellets using the finer points of the balanced instruments. Also other ordinary pluggers. *Always use the cohesive gold in restoring the occlusal surface,* for the reason that *form cannot be given or maintained* with soft, unannealed gold. Furthermore, in placing non-cohesive gold in the deeper portions of our cavities, the danger to wall fracture is further minimized, for the reason that we do not get the wedging force from non-cohesive gold.

I use the holding instrument, as a rule, from the starting of the first pieces to the last pellet. With the plugger point in the right hand and the holding instrument in the left the pellet is passed to the cavity and more quickly placed with the two instruments. The filling is held firmly in place in its early stages, thus less pronounced convenient points are required. The tooth is held, pressed into its socket, and is therefore more firm. A greater density of the gold will be secured with a moderate amount of malleting force, and the patient will be greatly relieved and the whole building operation much more comfortable. If this is not followed the elasticity of the periodontal membrane causes the tooth to be pushed in and out of its socket with each step of the plugger.

Our experience verifies Dr. Black's experiments wherein he demonstrated the advantages of hand malleting by the assistant. It is more rapid than when the operator does his own malleting. It is faster and less painful to the patient than the automatic mallet, and we believe that the results are better.

We have no quarrel with the other filling materials. We need them and are thankful to those men who have assisted in developing and improving the technics. *A high degree of success lies, perhaps, as much in the ability to determine what material is indicated in a certain case, as it does in having the ability to do the thing well after that decision is made.* We believe the inlay deserves a place in our operative work. We believe there is a very limited field for silicous cements, but we do *not* believe they have won or deserve the wholesale use to which they are being put.

Gold foil, has won and deserves a prominent place in your practice. Is it getting it? It has been a faithful friend to dentistry. The best operators our profession has produced have used it extensively for over half a century. It has been rivalled but never excelled. Its technic absorbed many more pages of Dr. Black's Operative Dentistry than any other subject. It stands today, as it did when he wrote the closing chapters of his great book, the peer of all filling materials.

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Discussion

G. M. Hollenback, Los Angeles, California: It is impossible for me to take serious issue with Dr. Prime on any of the vital points he has set forth, for in almost every instance his views coincide with my own. He believes that gold foil is the material par excellence for the saving of teeth, and far be it from me to disagree with him. Gold foil is one of the very oldest materials used in dental

restorative procedures, and it has stood the test of time better than any other. To condem it, or even to doubt its merit would be almost equal to destruction of the very foundation on which our present day conception of operative dentistry is builded.

As for other methods and materials, they all have, with the exception of one, certain inherent properties which preclude their use where operations of a really durable nature are to be made. This one exception is the cast gold inlay, a method which in comparison with gold foil is new, but one which all must admit when properly used has a large place in modern operative dentistry. To say that a gold inlay, even when well made, will do as good service as a gold foil restoration is making a statement that as yet no man has a right to make, for none of us know now, nor will we know for many years to come. But even now we are amply justified in believing that the inlay occupies a position closely rivaling the foil restoration.

In this day too many of us are on the lookout for the quick and easy, and those operative methods which are most spectacular from the standpoint of the patient. There is nothing spectacular about a gold-foil restoration, but it certainly meets the requirements of a good efficient dental restoration in a great many cases. In the fifteen years that I have been in practice I have seen many things come and have seen almost of them go. A few, one of which is the cast gold inlay, had real merit and have come to stay. The gold-foil filling had its inning a great many years before this, and I well remember hearing several operators of considerable reputation make the statement that the gold filling was obsolete and there was no justification whatever for its continued use. However, it has weathered the storm, and I believe that it is coming back strong.

In conclusion I wish to say that I thoroughly appreciate Dr. Prime's practical idealism, and I hope that his views will receive the consideration to which they are entitled, thus accomplishing great good, not only to our profession, but to mankind.

G. B. Baird, Los Angeles, California: Dr. Prime and I started on this paper about 20 years ago. We got a great deal of information from those men that had gone long before our time, men that had proved years ago that gold-foil filling has its place and had earned a place among our filling materials. One part of this paper that I had nothing to do with is the selecting of the title. I don't like the title, "Has gold foil earned a place among our filling materials?" Has the family Bible earned a place in our home? Can you get nearer to the truth than you can when you get to working in gold foil? I don't know of any material that ever was, now is or ever will be as good as a well made gold-foil restoration.

Dr. Prime, (Closing): As to the time required for making inlays and that for making gold-foil operations in the same class of cavities becomes, very largely, a personal equation. Some men work more rapidly than others in whatever work they are doing. Then too, some have very short, quick methods for making inlays. However, it took me an average longer time to make the inlays in the same class of cavities, that is, in class two cavities in bicuspids and molars, than it did foil fillings. The matter of time should not enter into any great degree. We should not choose one method over another because one is the quicker. Understand me, I do not advocate gold foil as a quick method of filling teeth. I gave the figures as outlined in the paper to prove that in my office, and by our technic, it takes longer to make a good inlay than it does a gold-foil filling in those cavities where conditions permitted the use of either material I chose to use.

As to the conservation of tooth structure I will grant the inlay has possibilities. Most operators, however, cut the teeth as much or more for inlays than they would for gold foil. As stated in the essay the least possible cutting should be the rule and we will welcome the day when the useless, extreme cutting of vital teeth will be discontinued. Many cases present where foil fillings may be made with a greater conservation of tooth tissues than if an inlay were used. Then on the other hand, inlays in certain cases may be made with very little cutting of the teeth, less than what would be required for a foil filling.

THE DENTIST'S PLACE IN PEDIATRIC PROPHYLAXIS

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(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

THE pediatrist and the dentist must approach the subject of children's teeth from different points of view. To the dentist, teeth are, in themselves and for themselves, objects of solicitude, while to the pediatrist the teeth are but a part of the digestive system of the child. Nevertheless, these same teeth are constantly a source of much worry to the specialist in child care. These worries begin for him very early in the course of his little patients' lives, when mothers, grandmothers and other fond relatives want to attribute all the baby's discomforts to the nuisance of teething. Later on when teeth really are erupting, they become one of the most dangerous enemies of the child, for serious illnesses—tonsilitis, pneumonia, meningitis and infantile paralysis are often overlooked because it is believed that teething of itself can cause serious fever, extreme malaise and even protracted convulsions. While the family lulls itself into a sense of security believing falsely that with the appearance of another tooth the serious disturbances will abate, the untreated disease often goes on to a fatal issue. When it is remembered that from the sixth to the twentieth month a tooth is erupting, has just erupted, or is about to erupt, it is easy to understand the popular tendency to blame teeth for almost all of a baby's ills.

Once babyhood is passed, the maintenance of the deciduous teeth in a state of proper health during the pre-school age becomes a pediatric duty that can be carried out only through close co-operation with the dentist, and the fact that of the children applying for admission to school eighty-five to ninety per cent have dirty or carious teeth testifies that someone has failed in the co-operation. Too often the pediatrists have been neglectful, but at least they can say that many times they have asked dentists to fill temporary teeth and have been laughed at. Many times they have sought dental prophylaxis for the little ones and found it not, or found it only in free clinics, yet pediatricians are fully aware that much malnutrition follows from dental caries in early childhood. Starch indigestion, for instance, a very common disability of this age was shown by Ruffaker to be caused by caries of the molars. Starchy foods, he found, were swallowed without proper mastication. Fermentation followed, irritation of the gut, frequent stools showing evidence of intestinal irritation in the shape of free starch and mucus (a condition identical with the so-called mucous disease of earlier writers). Under such circumstances abdominal pain frequently interferes with meals, and the child loses appetite—as a natural result, loss of weight and loss of well-being follows. A change of diet, it is true, will often remedy the condition without resort to dentistry, but repair of the teeth permits recovery without a change of diet.

One of the most extraordinary examples of clinical obliquity occurs in dealing with little children who have many carious teeth who, while their dental decay is neglected, are subject to tonsillectomy because they have enlarged tonsils and are underweight. It is easily demonstrated that the cleaning up of the mouth and the repairing of the

teeth of such a child will improve the congestion and swelling of the pharynx and tonsils. How often, too, does it happen that parents are led into undue alarm because enlarged submaxillary or cervical glands drawing from alveolar abscesses or gingival infections have mistakenly been diagnosed as of tuberculous origin.

It is rare that alveolar or gingival infections lead to focal infections during childhood, but cases of endocarditis, synovitis and nephritis in childhood have been recorded as arising in children with such infections in the mouth, children who showed no other source of primary infection.

Unexplainable fever is one of the bugbears of the pediatrist's existence and, curiously, often he forgets to search the mouths of children for alveolar infection. Many such infections when found and overcome prove to have been the source, often the painless source, of the mysterious degree or two of fever so persistent and so puzzling. Aside from the digestive difficulties that arise from dental decay, the effect of the discomfort tender teeth cause reacts very definitely upon the nervous system of young children. Such teeth are, undoubtedly, the commonest cause of headache. The sharp lancing pains spreading up into the scalp and bringing with them tenderness of the head to touch, may set the pediatrist on a wild goose chase in search of a suppositional lesion of the brain. The dull ache of half dead teeth with eroded dentin or of periodontal irritation long continued will wreck the powers of attention of any child and lead to mental backwardness. Such a state of affairs is often the cause of restless, broken sleep, and these factors together will soon change even the sunny tempered little one into an irritable, unmanageable child.

Little need be said of the effects of early decay, tenderness and lack of use, on limiting the growth of one side of the jaw through partial disuse, or of the secondary results of such growth limitation upon the form and caliber of the nasal passages. These are problems in orthodontia. Here the dentist is authoritative and upon his authority the pediatrist must rely for the right advice.

However, in this field of orthodontia, there sometimes may arise a clash between the orthodontist's enthusiasm for a perfect bite, and the pediatrist's belief in what is best for the child who bites. For certain types of children unstable in their nervous system and oversensitive to stimuli, orthodontic appliances may become actual agencies for evil, wrecking attention, interfering with sleep and leading to nervous, over-tension, neurosis, tics and malnutrition. Orthodontic appliances have been apparently the cause of long continued fevers, at least protracted fevers have been known to disappear after the removal of such appliances.

Not less interesting than the diseases and disabilities caused to children by defective teeth are the defects in children's teeth caused by disease in childhood. The effects of congenital syphilis on the dental formative activities going on in the deep, hidden protection of the alveolar process have been so long known that little need be said except that if all the dental defects which are attributed by some to this disease in truth arose from it, then syphilis would be even more widespread than it is.

Just now in the white heat of enthusiasm for animal experimentation much time and cerebration is being devoted to rickets and to scurvy in regard both to the bony and dental pathology of the diseases. In both diseases, dental damage is an accompaniment of more widespread constitutional changes.

There is another disease of children, acrodynia, which was first described as a clinical entity by Bilderback of Portland. In this malady, painless exfoliative gingivitis with shedding of some of the deciduous teeth is a feature of many cases. This disease occurs at any time from the sixth month to the sixth year.

It is apparently a form of toxic peripheral neuritis; it is characteristic of it that the hands and feet swell, redden and are subject to intense pain apparently of a paresthetic nature. There is also always some itching rash to be seen on other parts of the body as well. Some of the patients develop this rash in great intensity, sometimes it becomes general, attacking the skin of all the body. Branny desquamation of the hands and feet gives a worm eaten appearance to the soles and palms.

While the gingivitis is extreme, the process apparently spares the tooth germ of the permanent set. In fact, one child known to the writer, who lost all of his upper temporary set that had been eroded, developed permanent teeth extraordinary in size, color, hardness of enamel and resistance to disease. Another child, however, who had remained undiagnosed was seen after mistaken effort had been made to aid her. Following the exfoliation of her teeth, the tooth sockets had been subject to long and repeated curettement, osteomyelitis of the jaw set in and a secondary infection followed. Osteomyelitis of the femur was a sequel of this while multiple subcutaneous abscesses combined with the bony lesions to plague the poor little girl, who, after sequestrating a large part of her right superior maxilla, seems now on the road to mutilated health.

Rickets gets credit for much dental defect. Undoubtedly its morbid process influences the growth of the jaws to their detriment dwarfing the alveolar processes, crowding the teeth and influencing them to malposition. So much seems assured by the work of many investigators, notably by that of Sisson and Wolfsohn; but that uncomplicated rickets is responsible for delayed eruption, dentin anomalies and early decay is questionable. Certain it is that any pediatrist can recall many extremely rachitic children, whose teeth were erupted early and when erupted proved to be large, well made and as resistant to decay as any teeth could be. On the other hand, children whose bones and muscular tissues are perfectly healthy may be subject to delay in dentition or to the eruption of teeth with a defective enamel development or perhaps to both conditions at once. Certain it is that the eruption of teeth whose enamel is so incomplete that pits and fissures result, especially, on the occlusal surfaces of bicuspids and molars is a primal factor in the production of dental caries in the young. The dentin of such ill-protected primary teeth is usually found subject to the peculiar hidden form of cavitation in which the orifice of the cavity is small and its depth wide-spreading and far-reaching. It is such teeth that surprise physician and dentist alike by suddenly, one day, when their external shell gives way, revealing the fact that their apparent soundness was but a hollow mockery. Regular search, early detection and prompt filling provide the only useful prophylaxis in such cases.

There is a tendency abroad today amongst dentists and medical men to discredit Miller's bacterial theory of decay. The experimental reports emanating from the Mellanbys, Howe, McCollom and Osborn and Mendel all tend to show the influence of diet on bone and tooth production and perfection, but they are being taken at a greater worth than their face value, great as that is. The factors which enter into the development, retrogression and decay of teeth are complex. No single explanation invoked is likely ever to clear up more than a very small part of the complexities to be encountered in this field of clinical medicine. Certainly a consideration of the type of cavitation with widespread dentin destruction under minute defects of enamel will tend to bring one into sympathy with Ford Robertson's ideas. This Scottish observer believes that Miller's dicta about the bacterial origin of caries is coming to be doubted today, not because it has been overthrown by facts, but because facts

have not been forthcoming to support it; and he argues that a wider application of anaerobic methods of bacterial culture to the problem would produce the facts necessary to support the thesis.

Failures and faults in the growth and functions of the enamel organs undoubtedly may result from systemic disease, especially from chronic nutritional disorders and chronic bacterial disease such as syphilis and tuberculosis; and it possibly may be that the acute infectious diseases produce limited and localized damage to enamel organs by temporary disturbances of the circulation with resulting fissures and pits in the enamel which permit access of anaerobes to the dentin. The role that malposition of teeth crowded in a jaw dwarfed by rickets may play in producing the proximal type of decay can be better appraised by dentist than by pediatrist; but there may be danger in letting ourselves depend too greatly on the deductions that have been drawn from experimental work in rickets, especially upon those deductions taken from the results of animal experiment. In the first place, there is more than a question about the identity of experimental and of human rickets. Again, comparison of the work of equally competent observers presents conflicting reports. Howlands' demonstrations that calcium and phosphorus must both be present in the blood in sufficient quantity and in available form, and that cod-liver oil renders blood phosphorus more available are almost the only positive chemical facts developed. Hess has shown that radiant energy (sunlight and quartz light and carbon filament) is influential in preventing rickets. Findlay in Scotland brings evidence that exercise, fresh air and sunlight are preventive of the disease and at the same time he discredits Mellanby's theory of an antirachitic vitamin. The application of Mellanby's experiments to human individuals is further brought into doubt by Hutchinson's Indian observations. This physician finds that rickets is common amongst the better class Hindoos whose children get a high vitamin containing ration but who are confined and kept out of the sun; while it is rare amongst those of the poor class who, in spite of a diet low in vitamins, are largely rickets free, apparently because they have plenty of exercise and free access to the sunlight. Although the whole explanation of early decay is not to be found in the theory of avitaminosis, it is logical to suppose that the same dietetic errors which produce xerophthalmia, dry, brittle hair and dry skin can synchronously produce changes in the tooth sacs which themselves are also epithelial structures, changes that can interfere with development of dentin and of enamel and so begin the train of events that ends in decay. The study of vitamins in relation to health is important, not more so, however, than the consideration of the sufficiency of amino-acids. Certain amino-acids are essential to the proper synthesis of body protein and it is necessary to realize the need we have for these fundamental chemical substances in our diet.

It may well be that in rickets the cartilages are unable to accept calcium and phosphorus properly because of amino-acid unbalance in the protein constituents of the cartilage and it is probable that an analogous condition exists in the dentin of such teeth as are unduly prone to decay. Here at least is a problem for research that ought to repay effort.

Even the most enthusiastic of those who would attribute so many human ills to a diet lacking in vitamins feel a little uncertain that the whole story can be told in terms of vitamins.

Just now it is becoming the mode to consider that the unexplicable powers of these mysterious alphabetical forces, vitamins A. B. C. (and, if you follow Mellanby) act by some occult conjunction with the internal secretions of the ductless glands. We do know that both thyroid and pituitary gland extracts, es-

pecially the latter, have a potent influence over skeletal growth, particularly over the growth of the long bones and the bones of the jaw. So far as I know, no experiments have been made to discover the effects of pituitary gland feeding on the development and durability of the teeth.

Amongst the causes of dental defects, narrow jaws, high palates, imperfect enamel and evanescent dentin, can we forget heredity? Pattern and tissue quality, potentials of development and limitation of life duration seem to be forces that run in the family stock, mutating and changing ever so little from generation to generation, in the age-long effort of nature to adapt the human to an environment that the restless, discontented soul of man is widening, deepening and speeding up day by day with increasing energy. The ductless glands, the chemical constituents of the body, and changing physical structure, are doubtless agencies through which the forces of heredity are released, agencies whose secrets we are slowly gaining in a way which promises us that some day we can use them to influence the course of life and bring it more into consonance with our own purposes.

But all such considerations, physical, chemical, physiological and philosophical are of value only as we can use them to anticipate and defeat the stealthy machinations of death which seizes on us and begins our destruction at the moment of our conception. In the struggle to live we need our teeth and we need them all, and if we are to keep them we must have skilled aid from the pediatrist as well as from the dentist.

Prevention and service are the most authoritative words in medicine and in dentistry today. The pediatrist and the dentist must come closer together. They must exchange information and enlighten one another with the points of view each has gained from his own stand of vantage. The teeth of the next generation are to be saved by a study of the teeth of this generation, not only of the teeth but of all the complex functions of the body that influence the development of the teeth; prenatal care, a well considered dietetic scheme which will provide the expectant mother with a proper well balanced diet in which abundant minerals, sufficient vitamin bearing fats and proteins adequate both in quality and quantity, together with attention to every detail of her health will insure the birth of a baby whose jaws shall have the buds of good teeth in them. At the least, the child will be born ready to develop all its tissues, teeth included, to the highest potential his inheritance will permit. Later, during lactation, the same sort of scrupulous oversight of the mother's health carries the insurance still further along into the child's life, and if, unhappily, artificial feeding is needed, skilled direction must be provided and it will prove an indirect, but no less positive, form of dental prophylaxis.

At last, with the teeth erupted and in order, the pediatrist can invoke the aid of the dentist, ask that he provide during the pre-school age a quarterly inspection that will discover faults in the enamel and the earliest signs of cavitation; that will instruct the parent and the child and inculcate early the habits of oral hygiene. In fact, we are looking to the dental profession to make every dentist's office into a preventorium against dental disease, a preventorium in which children will be saved from distress and disease. If such a plan were widely adopted and the co-operation of the dentist and pediatrist secured for children of the pre-school age, we should no longer be confronted by those appalling figures which testify that ninety per cent of the children seeking admission to the public schools have dirty, neglected or carious teeth; and if the dentists will do their part in this co-operation, as they assuredly will, they can perhaps all the more look to the medical men for aid in feeding their patients.

A search of current dental literature

reveals the startling allegations that hard foods and fibrous food are essential to dental health; or that hard foods are of evil influence on the gums; or that a quart of milk a day is needed for every child, but that milk is a bad food for the teeth because it is not chewable. To one group, sweets, starchy foods, white bread, biscuits, chocolate, cereal, porridges, eggs, rice, fish are all detrimental while another insists that without these there can be no health in the teeth. As a matter of fact, the conflicting advice merely shows that amongst those who practice dentistry there is no settled, generally accepted opinion as to the causes of dental decay nor about the food factors that will insure strong teeth.

From the pediatrist's point of view, what is needed for development is a well balanced diet, one in which energy needs are met by an adequate amount of food. Of the calories of the diet, not less than fifteen per cent nor more than twenty per cent should be derived from protein. Care should be taken to insure that the proteins used carry a variety of amino-acids, and that they are not deficient in those amino-acids known to be essential to growth. In calories twenty to thirty per cent of the food intake should be fat and the remaining calories needed must be supplied by carbohydrate. In the food of the growing child and of the pregnant and of the lactating woman, the calcium and phosphorous intake should be known, and it is well to watch the balance between these minerals and sodium and potassium. The vitamin containing foods, cream, butter, cod-liver oil, orange juice and green vegetables must be given in proper quantity.

The dentist keeping these principles in mind can feed the ordinary well child quite as well as the physician, but all children are not of ordinary reaction in regard to food. The very child the dentist is most apt to be anxious about, that one with poor teeth or the one who bears stigmata of rickets or of malnutrition is most apt to be the one who is difficult to feed. The dentist who wants especially to insure that the quart of milk is taken may forget that a quart of milk taken as a beverage may interfere with appetite and so prevent the ingestion of a properly balanced diet, or he may not know that for many children, milk is far from an ideal food, in fact, one to be shunned as productive of constipation or of intestinal proteolysis with the absorption of toxic products which react badly on the child's well-being. In fact, of the milk taken, about one-half ought to be used in the preparation of food to be taken at mealtimes and not more than a pint reserved for beverage purposes.

There is also the dentist's predilection for coarse foods, whole wheat or bran breads and fibrous foods, all very well for some but for others productive of griping tenesmus, flatulence, abdominal pains and much malaise.

On the whole, when one considers the possibilities, it would be better if in the co-operation between dentist and physician, the prescription of diet were left largely to the latter.

Briefly, these are a few of the thoughts one pediatrist thinks about the dental problems of children. I would express my faith in, trust in and admiration for those of my sister profession; a profession, which like medicine, is a liberal profession. Liberal because its members are willing and eager to take up the burden of teaching the patient how to prevent those very ills they are so well prepared to heal. These two liberal professions co-operating to search out the causes of dental disease in childhood and to bring all their power of prevention to bear against it, can with certainty lessen childhood's burden of pain, disability and death.

SELLING HEALTH—LET'S ADD TEN YEARS TO LIFE

By L. F. SMITH, D.D.S., Indianapolis, Indiana

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

SIR W. TEMPLE said, "Though I may not be able to inform men more than they know, yet I may give them occasion to consider." Full denture prosthesis is a true specialty of the dental specialty of medicine. Whether the operator is giving all of his time to it or not when he attempts to restore an edentulous mouth, he is doing special work, as all else he may be trained to do is laid on the shelf while he becomes a specialist in a special work.

It certainly will be appreciated by the profession as well as by the laity, when enough competent men devote all of their time to this important specialty, to be able to care for at least those who think of their health and comfort enough to demand the best they can get, after the loss of the wonderfully beautiful, useful and much complicated natural denture.

There are so many problems to be mastered scientifically, that the necessity of making this a special work is being realized. When one comprehends the many problems entering into the formation of a natural denture, knowledge of the importance of artificial denture construction has been gained. Surely such a marvelously complicated arrangement of nature cannot be replaced in such a manner that it will reproduce even a small percentage of the requirements of this natural organ in the simple manner usually employed in the construction of the artificial denture; namely, that of taking an impression and bite, then sending them together with shade and mold, to a laboratory, and proceeding with general practice until the finished dentures are returned for delivery to patient. In other words, as I heard a distinguished specialist in prosthetic dentistry refer to such dentists, they are merely acting as commission agents between the patient and the laboratory.

If we could only think of fundamentals every time a new patient presents and work with that thought in mind, how much better it would be for the patient and for the dental profession. Every operation, no matter how slight, is fundamentally related to the whole system, and should be performed with the same precision as though everything depended on that small item. Once in a great while we have the privilege of seeing the mouth of someone who has been the patient of a man who pays close attention to the whole subject of dental science when operating. We are always sure to ask who did the work. We can all recognize thoroughness. Why do we not do the thing which we admire in others? How much more we would enjoy our work.

Beyond question, the first consideration which enters into all dental operations is prophylaxis. Any kind of an operation, from the first cleansing of the

deciduous teeth to the last full denture made is based on prophylaxis—prevention. The most important prophylaxis is that which prevents decay and gingivitis and preserves the whole mouth in a healthy condition. This dates back to childhood. All other prevention is necessarily modified by the stage of the progress of disease, but is none the less important because of that fact. The problem is changed and complicated because repair must be added to prophylaxis and done in such a fashion that both repair and prevention of further degeneration are accomplished. In dealing with edentulous mouths the case is made still more difficult, due to the advanced age and lowered resistance of the patient. Our aim is to prevent ill health due to the loss of the masticating machinery.

General systemic conditions may govern many operations and make it necessary to do one thing instead of some other. The average man does not see the whole problem when the patient presents. One may have a large fund of knowledge and never know how to connect it with a case in hand. The history of a patient should be the first consideration. Sometimes much can be gained to establish a starting place. If the patient has been having trouble with dentures, as much as possible should be learned concerning the nature of the trouble. If he has never worn a full denture, find out, if possible, the length of time since the different teeth have been extracted. Changes in the form of the jaw may have taken place, due to an unbalancing of the normal stress of the muscles, making a difficult case out of an apparently easy one. Some changes of this kind may be so extreme that it will be impossible to restore normal conditions. In cases where the bicuspids and molars have been missing for a long time, a great change in the form of the mandible may occur, making a very difficult case, and a knowledge of the time of extraction may be of great value. The length of time since the complete loss of all the teeth may give a valuable clue to conditions of both bone and muscle changes that would be of great value in making a diagnosis. It is well to know something of the physical history of the patient in order to estimate the amount of trouble to expect from causes outside of the technical work you do; for instance, there are conditions causing swelling and shrinking of the soft tissues that you should know, so proper reference may be made to the physician before attempting to make a denture. Nervous or circulatory disturbances, or acidosis will cause this condition and it will be well to correct if possible before proceeding.

In all cases, the history will be a great aid to a correct diagnosis, and also be of great advantage in arriving at a thorough understanding with a patient, which understanding is of very great importance and will have a favorable bearing on his mental attitude and thus on the general health.

The very first consideration in dealing with a denture patient is the complete eradication of oral infection. There are many people who are carrying infection in order to retain partial dentures, or some other restoration, that certainly would be better from a health standpoint if their mouths were made clean and a good full denture produced. In edentulous mouths a radiographic examination is the logical starting point. This will disclose any hidden areas of infection or retained roots, as well as any variation from the normal in the condition of the bone. All infected areas must be eliminated and roots removed, if we are to obtain the highest degree of efficiency from our dentures.

True, it is easy to be deceived in connecting focal infection with disease, as our work does not directly connect us with the physical condition of our patients, their complaints to us not being as to a physician. They come to have a cavity filled, a plate made, or a tooth removed, and it is easy for us to accomplish these results without our attention being called to any connection with general physical conditions. The average dental patient looks upon the dentist merely as a mechanic, as compared with the medical man. Nevertheless, the dentist should not forget that he is dealing with a man's health, when he passes by pulpless teeth and does not give close attention to all sides of this important subject. He has been trained to do mechanical work, without much stress having been laid on the physical benefit to the patient and he apparently resents any interference with his stereotyped method of procedure. The best dental college is only a preparatory school, teaching the fundamentals, and giving a certificate or diploma which admits a student to the real college, that is, the dental office and dental societies. New methods and ideas must pass through all stages of development in the office, laboratory and society, before they become established facts, available for teaching in the dental college. For this reason a large majority of dentists are neglecting ideas and methods which have really proven successful, but are not yet sufficiently established to have become incorporated in the curriculum of the dental school. They are thus depriving their patients of much valuable service which is available and safe, long before it can be taught by means of the dental course. The conscientious man will accept all the proven facts to date and base all that he does upon them until new discoveries show a better way, and then adjust his work to suit the improved way.

This is where we are as regards focal infection. We should not be radical either by doing too much or too little. Certain facts are known and we should be governed by them. Statistics show that more people die each year from heart disease than from tuberculosis. For instance, figures taken from the Indiana statistics for last year, show 180 deaths per 100,000 caused by heart disease and 160 per 100,000 caused by tuberculosis in all forms. To the above figures may be added the number of deaths caused by rheumatism, neuritis, nephritis and many other ailments, as possible results of focal infection. Furthermore, focal infection always becomes active when resistance is lowered by the presence in the system of some other infection.

All of us know what a menace tuberculosis is to the human family and realize what a fight is being waged on all sides to check it. Suppose our work stimulated the advance of tuberculosis as much as it does heart disease. In all probability the Board of Health would put a stop to our endeavors to save devitalized teeth. There is never a primary lesion on the heart. It always appears first at some other point and reaches the heart through the circulation. There are several acute diseases that cause heart infections, but more than fifty per cent of all heart diseases are due to focalized infections. Who of us dares to take the responsibility of jeopardizing a patient's life, for the retention of devitalized teeth. Eugene Talbot says, "A rule which I have adopted is that a patient's health is worth more than all the natural teeth." Who in the ordinary dental office is able to judge just how to differentiate between a safe risk and a dangerous one? The big insurance companies will, after you have been examined by the best medical talent they can employ, bet you $100,000 that you

will live twenty years; yet you may drop dead the next day, week or year, from some condition you had when they accepted you as a good risk. The only way to be safe in taking the risk of gambling on focal infection, is to eliminate all of it in the mouths of persons showing any systemic weakness, and only take a chance with patients who appear to be normal in every way and who will return to your office at regular stated intervals for re-examinations and checking up. The reason for this caution, is as we all know, that immunity is only relative and not absolute, and a patient may have great resistance to focal infection at one period and within a very short time thereafter, be greatly affected by it.

It is a great advantage to have the mouth properly prepared for immediate dentures when the teeth are extracted, as it saves many weeks of slow and tedious absorption, and protects the normal condition of the muscles of mastication. Mouth preparation can, of course, be carried to excess and irreparable damage be the result; the same may be said of alveolotomy, alveolectomy, extraction, or anything that will remain a permanent result after accomplishment.

Great care should be exercised, especially by men whose word carries weight, when giving warning concerning the wholesale extraction of teeth, not to teach undue retention of devitalized teeth. This has been the effect of much of this kind of effort. Some way of teaching the average dentist how to arrive at a safe conclusion is certainly necessary. Many dentists are lost between the two extremes—with one side shouting "one-hundred per cent Vitality" and the other crying "Radicalism." Focal infection is what we are dealing with and it must be treated according to the danger it holds in store for us.

We are dealing with people, who in all probability, are suffering from the effects of focal infection, because an edentulous mouth has usually passed through all stages of infection before the patient submits to the loss of all teeth. And, again, we are dealing with patients, who, from their age, are passing through a crisis that naturally lowers their resistance and they are more susceptible to disease and need all the nourishment we can possibly aid them in getting. When all these conditions are borne in mind, it is apparent that the slogan, "Health in Dentures" should be kept on tap at all times.

There has been a tendency in many quarters to warn against extraction and surgical mouth preparation, as though it were the method which is wrong, rather than the application of it. This is just as dangerous as to let the so-called radicalist have his way. It must be more dangerous to the whole human economy to destroy too little than to destroy too much. One will impair vital organs, and the other a less vital part. This section must unite with all the other sections of the national association, to teach the proper balance in relation to the general health of the commonwealth.

Many men in different walks of life never learn to connect theory and fact. Knowing all about the different methods and technic in prosthetic work, and answering technical questions in an hour's examination by a professor, is one thing, and recognizing the case that fits each acquired theory when it walks into the office is quite another. It is no surprise to the teacher to see a student who stood high in a quiz fall down in practice. This is where the profession can stand by the student when he is promoted to this larger college—the practice of dentistry.

Our work is unlike almost any other

profession; it is all technic, ten-finger work, and this fact makes it necessary to stand close together and compare and improve our handiwork. The study clubs being arranged all over the country are probably the beginning of a system whereby the dental rut which so many get into, may be leveled to avoid dangers to which many have fallen victims in the past. Membership in one or more of these clubs should be made a requirement to the good standing of a member of this society. When each member is connected with the society in a working capacity, the dental profession will come into its own and all the improved methods will be distributed to all the members.

May I give you an illustration of my point? The state of Wisconsin has a law requiring a method of marking the state highways, which is very simple and efficient. All who have traveled by automobile in that state know how easy it is to go from any given point to another without asking everyone whom you meet, for directions. You can first determine from a map, certain numbers meaning certain roads and all you have to do is to refer to the map, pick out the number of the roads which you desire to take and follow the roads so marked to your destination. Now this system has been in effect for several years; why do not all states adopt the same law? We are all intelligent people, but for some reason we do not move as rapidly as we might, even when an easier and better way has been pointed out to us by some one more progressive. This is so easily applied to our work and so much can be done within one or two years if this society will just establish the machinery. How much more could this section accomplish if prosthetic clubs were organized all over the country, to work under proper instructors, with results returnable to this section for consideration and better organization next year? How much help it would be to the tired and overworked leaders, who are burning midnight oil in research, and using all the daylight wading upstream against the current of indifference and ofttimes opposition of the plodders who are satisfied with methods and ideas as they were taught them in school.

There are many men in the rut with abundance of ability if aroused. Many of our best men have been aroused by accident, and an organized effort will do wonders towards bringing sleeping giants out and exercising them by use of the proper "daily dozen." This sort of concerted action will advance the slogan of our association "Let's add ten years to life."

Full dentures rest on a series of fundamentals that tax the best minds to find, and requires a genius to build on. Very few know where to begin or where to stop in attempting to build a "chewing machine." It is not necessary to go into detail about focal infection, mouth preparation, esthetic effects, or any of the details necessary to the construction of a proper denture, but health in dentures depends on all of these. Good results in masticating food is the first and most important consideration, but a good appearance has much to do with health also, for being conscious of an unnatural appearance tends to nervousness and lowers vitality just the same as any other mental strain. Difficulty in retaining a denture also undermines the nervous system for the same reason. Having to remember to always bite in some particular way, or having to remember some particular way one must not bite, has a direct bearing on the health through the nervous system.

The material used in the construction of artificial dentures has much to do with

the health of the individual wearing them. Much harm is no doubt being done by the general use of vulcanite instead of metal. Vulcanite has a large place in denture work, but like many other things in dentistry it is being overworked. It is contraindicated from a sanitary point of view, and as a conductor of thermal changes it is a failure, making it unpleasant and unhealthful. It harbors bacteria and food for bacteria. It causes undue bone absorption and degenerative changes in soft tissue. Health in dentures calls for the more extensive use of metal base-plates. A serious training of the general practitioner should be carried on to produce a more general understanding of the importance of this fact.

The length of time one should wear a denture is a question that must be given intelligent consideration. One who is unfortunate enough to have to resort to prosthetic dentures should be taught to realize that they should have a little attention once in a while, as well as the washing machine, electric sweeper, or automobile. Many mouths are injured by retaining and using a denture too long and the danger of producing malignant growths is not small.

There should never be consciousness concerning any feature of a denture. When all is completed and the patient has become adjusted to and experienced in the manipulation of the dentures, he should be able to forget he has a mouth.

Selling health is the real occupation of all dentists, especially those who are caring for edentulous mouths. All depends on that man. He is responsible for any infection that may be left in the jaws. He is also responsible for so much which the average man overlooks when making a "set of teeth,"—the ability of the patient to masticate food, the proper consideration to protect the hearing, a natural appearance, and the avoidance of any mental hazard that will be a constant nervous strain. It is surprising what a little thing separates success and failure. A slight error in articulation will utterly destroy the effect of a good impression and that balance necessary to good mastication and comfort. A slight mistake in the distance between the jaws may impair the hearing; the wrong shade, mold or arrangement of the teeth will produce an unnatural appearance, the consciousness of which will prevent success. This is sufficient to illustrate the importance of making each of the many requirements balance properly with the whole to compensate as nearly as possible for the loss of the natural denture. Unless this is accomplished "health in dentures" is not attained.

To illustrate my point, may I cite one case that came under my care. My patient was a man of fine mental balance, for whom I made full dentures a number of years ago. At that time he was anemic and was also suffering from intestinal trouble. He had a bad mouth, affected with pyorrhea and badly broken down teeth. I extracted his teeth and in due time made full dentures. They were natural in appearance and were well received by his friends. The patient was entirely satisfied with them and so was I. They looked good and "stayed put." He located the best place to chew and was entirely satisfied with his success. His health improved and he got along as well as usual under such circumstances. A number of years after making these dentures, Brother Hall and others started some improvements around and I took a postgraduate course. Immediately afterward I sent for Mr. B, the above mentioned patient, and arranged with him to make a new "set of teeth." I wanted to make teeth for

him particularly, because he was a man who could appreciate what was to be done for him. This time I made dentures for him with which he could "chew" his food. He could move his jaw around anywhere and get back with it. He can now cut food instead of just mashing it and as a result has very much better health. He has a natural appearance, his jaws are the proper distance apart, he has the correct shade, mold and arrangement. His friends cannot detect the artificial appearance so often evident in dentures, and the good solid comfort which he enjoys, together with the proper mastication of his food, has eliminated an intestinal condition which had suggested malignancy. His weight and color are normal and considering the fact that he is several years older than when he first came for my attention, his case is splendid proof of the arguments set forth in this paper.

Discussion

W. J. Pryor, Cleveland, Ohio: Dr. Smith's statement that too many dentures are being made of vulcanite, instead of metal is also well taken. I am in full accord with him here, as recent experiments have shown me that bacteria, fungi, and the products of their growth, are present in greater abundance under vulcanite dentures, than under metal ones. An unclean denture makes an excellent incubator for bacteria, and while we cannot say at present that these bacterial growths have a bad effect on the patient's general health, it is very apparent that the tissues of the mouth are affected unfavorably by them. The metal dentures are not only more cleanly, but certain of the metals used have an inhibitory effect on bacterial growth.

Unlike Dr. Smith I cannot lay any of my knowledge on the shelf when I start out to build dentures for a patient, for although all of my time is given to this work, I usually have to call on all of my resources, and often wish that I had more to call on, in order to obtain results satisfactory to both patient and myself. There is no doubt in my mind that prosthetic work is the most difficult of all the dental specialties.

It is a fact to be regretted that, as Dr. Smith points out, most dentists merely act as commission agents between the patient and the laboratory. Dr. Smith is a step behind here, however, as the latest development is not to take an impression and bite, and send the work out to a laboratory, but to call in a laboratory man, introduce him as Dr. ——, specialist, and have him do all the work from impression to finish, and split the fee fifty-fifty.

This state of affairs is the result of some dentists and commercial institutions giving post-graduate courses to men who could not even qualify for an undergraduate course. They think selfishly of their own financial gain, and seem not at all to see the bad effect this is having on the profession in general.

Dr. Smith states that it is no surprise to a teacher to see a man who stood high in his examination, fall down in practice. This apparent fact is due not to the student, but to the teacher who is unable to recognize ability when he sees it. No student who shows an ability to use his brain and hand in school, falls down in practice.

There is nothing in this paper to indicate that the title "Selling Health" belongs to it, and I am pleased to note this fact. Dentistry is afflicted with too many men who are sellers and not dentists at all. If they were both sellers and dentists it would be better. Health is a condition, and can no more be bartered, than can happiness.

The cause back of our dental troubles is faulty diet and our artificial mode of living. Hardship makes man hardy while soft living makes us soft. So long as we follow the easy way, our physical defects will be with us.

T. A. Hardgrove, Fond du Lac, Wisconsin: If our object is to promote good health through the medium of the normal functioning of the oral tissues, including the masticating apparatus, we have to go back beyond what we are considering as childhood. If the proper balance of the endocrine system influences the formation of the jaws and the teeth, proper thyroid and thymus function is necessary. There may be other endocrine glands entering into and assisting nature in her effort to produce normal jaws with normal teeth for a certain individual.

In the first place, the jaws should be sufficiently large to accommodate the teeth that are to be imbedded in them, and the teeth should be sufficiently large for the masticatory requirements of that individual. Now in the formation of the teeth, as we know, in part of the process, we have what are known as "islands of calcification," and as the progress goes on, those islands of calcification coalesce, and the coalescing should be so perfect that it practically eliminates deep fissures and crevices, which are responsible for so much decay.

The point that I am making is, that if we

can observe early the tendency of the mother to a thyroid disturbance (and many mothers in certain sections have thyroid disturbances) something in the way of diet and medication, iodin in thyroid defect, and proper mode of living may accomplish and influence the mother's economy in the proper formation of the jaws and teeth of the offspring. If that can be accomplished we have taken a long step in the direction of prevention. It is, I believe, the duty of the profession of dentistry, to call the attention of the medical profession to the importance of determining whether or not the offspring of certain mothers are liable to have jaws of normal or deficient development, and teeth of perfect coalescing calcification. It is another demand that the two professions work with more earnest harmony in the great field of the prevention of disease and discomfort; and I believe, too, that much orthodontia that is so necessary today, could be avoided if a greater knowledge of the endocrine influence upon the maxillary bones and the teeth they contain, were at hand.

Dr. Smith very nicely calls attention to the importance of the physical history of the patient. That history will, in a measure, determine whether the jaws of the individual for whom the artificial denture is constructed, are liable to be normal or otherwise. If the endocrine gland activity or balance was proper in early life, when the time comes that such a patient will require an artificial denture, he will have a normal bone framework upon which to build that denture.

There are many cases (more than we think) where the individual will have a slight shrinking of the tissues over which the artificial denture is to be worn, due to a diabetes or circulatory disturbance—particularly a diabetes. I recall a case in which there was such a tissue change during the twenty-four hours that the patient was continually complaining of the denture fitting at one part of the day and very uncomfortable at another. The dentist was unable to determine what the cause for such a complaint might be, and referred the patient to me, to see if both together might not be able to find a reason for it. After taking the patient's family history into consideration, it became apparent that the majority in that family, after a certain age, began to show sugar in the urine, and on that basis the patient's urine was examined and found to contain the usual sugar. The patient's plate would fit quite comfortably early in the morning, but as the day wore on, mucous membrane and tissue beneath it appeared, to become edematous toward afternoon or evening, and interfered with the comfort of the plate. I cite that only to give emphasis to the point that has been made, that a physical history is of importance, even in the construction of artificial dentures.

Dr. Smith calls attention also to the very important fact of beginning the operation of dental construction by being absolutely certain that the oral tissues are not still harboring focal infection, and suggests a full-mouth x-ray to be certain that no focal infection remains.

The pulpless tooth is bothering Dr. Smith, as it does every other man in the practice of dentistry. Whether we should extract it as a routine practice, or retain it, as a part of good judgment, is one of the things in the practice of dentistry demanding a most careful consideration and the best possible training along scientific medicodental lines. This is one place where it is important for a dentist to have scientific, dentomedical training, and one place too, where the history, properly studied, in particular, will aid in the formation of the judgment that will save teeth for the patient, without a predisposition to focal infection, and will advise the extraction for those so predisposed.

This much is true, that if, as the doctor says in the state of Indiana the statistics for the last year show 180 deaths per 100,000 caused by heart disease, 150 per 100,000 caused by tuberculosis in all forms, to the above figure may be added the number of deaths caused by rheumatism, neuritis, nephritis and many other ailments that are caused secondarily as a result of focal infection, indicating that most of the diseases are the result of infection, and that a great proportion is of the focal infection type, and in a large measure, preventable, and we as dentists have it within our power to do a tremendous work along the line of prevention. But that is not enough. We must study more and point out the avenues of infection, the method by which disease which results in the patient's death, occurs; and show, too, the method by which such a disease progresses. The time is not here and probably never will be, when we can determine absolutely whether it is safe to leave certain teeth in or not. We do know this—that if suspicious teeth are extracted we have at least given the patient the benefit of the doubt. But there are certain diseases for which we have been advised to remove the teeth that have not shown one particle of benefit for such a practice, and surely the unnecessary strain and risk associated with such a patient is uncalled for and unjustified. There are certain cardiac disturbances when the patient has reached a certain level, deviating from the normal, upon which it is not only useless, but dangerous, to extract teeth. I have seen patients so weak with heart disease that the least thing in the nature of a shock or bacterial

disturbance would undoubtedly result in the patient's death; who without the disturbance at this time would be able later on, to have teeth removed, when the risk was not so great, and the patient with rest and treatment would return to better health. Here is the type of patient that I refer to: you will be called in to see patients who are very close to the border line, and have a very low pulse pressure. (Pulse pressure is a better guide than anything else.) You will be asked by the patient to do extractions in large numbers, but my experience has taught me that it is a dangerous thing to do, and you will refuse to do it, regardless of what the patient says. You are the one to pass judgment on that, because you are doing the operation. Now if the patient has been given proper medical attention which may include rest in bed and the administration of digitalis, the pulse pressure will return to a point where it will be safe to do the operation, if you think it advisable.

Much has been said today about alveolectomy and its wonderful advantages. The fact of the matter is that alveolectomy or alveolotomy is possibly a justifiable operation, in a majority of cases. But this fact does remain—that with the ordinary extraction, there are many mouths that have gone on for years and worn dentures comfortably. Alveolectomy and alveolotomy can be carried probably to the extreme. It is dangerous to advocate it for every type of patient, especially the type of the cardiac patient. I could cite a number of types where the extraction is strain enough on the patient and the alveolotomy would be a mistake. I can conceive of no great harm to follow a proper removal of the alveolar process, that is bound to be resorbed anyway, except the discomfort to the patient and the possibility of cicatricial tissue. I have seen some cases where an extensive alveolectomy had been done and the tissue sutured together, with the result that scar tissue remained, and I believe that the less scar tissue you have beneath a plate the better off that patient is.

Some of us in times gone by, have thought that if we removed the alveolar process that the mucoperiosteal flap will just meet in its proper relation and cross the breach from which we removed the alveolar process, but that is not always true; although it is said to be. In some cases at the point where the mucoperiosteal flap unites scar tissue is present as a result of unnecessary traumatism, and I can conceive of no better thing to give the patient one of the contributing causes of cancer than the irritation of scar tissue beneath the plate.

Dr. Smith states that selling health is the real occupation of all dentists. I do not like the statement, so much being used today, of "selling our service." It is a commercial term, and I trust that the profession will grow less commercial as time goes on. There are certain influences without all the professional ethics, and clamoring for the spectacular today, who commercialize the proposition of selling health. The proper function of a dentist is to restore health and prevent disease.

Dr. Smith makes a very nice reference to the possibilities of protecting the hearing in certain individuals. It is claimed that there are people deaf as a result of poorly articulating teeth, abnormal occlusions. There are many who have the so-called end-to-end bite and a protruding mandible, with muscles so attached and used in such a way as to cause an absorption of the lower wall of the external auditory canal by the condyle of the mandible, bringing pressure upon the lining tissue, inflaming it to a point which results in its thickening and probable deafness. It is sometimes possible to effect a cure of that condition by changing the articulation, but it is a better practice to prevent it. That is just barely possible whether it occurs frequently or not, I can not say, but I do know that I have seen one case where the external auditory canal was perforated which resulted in impaired hearing. That is probably true too of the Eustachian tube, though I think it probably quite uncommon. Take for instance in the so-called end-to-end bite; after the patient is 35 or 40 years of age there is a sort of sliding movement, anteroposteriorly and laterally, as well. To prevent that very thing that I have just mentioned, I believe is one reason that nature had in overlapping the incisors.

A TRIED DENTAL EDUCATIONAL PROGRAM FOR THE LAYMAN

By RAYMOND GRANT, D.D.S., Louisville, Kentucky

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

A GREAT deal is being written on the general subject of oral hygiene, prophylaxis and preventive dentistry. If dentistry is to stand the test of the searching light of scrutiny, there is no doubt but that there must be a quickening of the dental profession, in getting over to the laity some of the basic facts underlying the program of dental practice.

The day has long since passed when it is sufficient for the dentist to feel that his obligation has been discharged toward his patient when the existing cavities are filled, pulps extirpated, crowns made and bridges constructed. His vision must be extended to include instruction of that patient in such care of his mouth, that will greatly reduce the possibilities of decay. The underlying principles of the care of the mouth must be so impressed upon the individual, that his visits for inspection to the dentist will be at such regular intervals that no pulps will be encroached on by decay, and as a result have to be removed.

The fact that diseased gums and infected apices of the teeth cause systemic diseases such as rheumatism, neuritis, heart and kidney lesions, cancers, etc., has been proven beyond a peradventure of a doubt. These facts must be taken into account in the routine practice of our profession. The day has passed when a dentist can conscientiously say to his patients, that a pulpless tooth is as good as a vital one, and has no potential factor of danger. The above enumerated facts in a broad way to my mind, are responsible for the imperative demand from the deep thinking, high-minded and unselfish members of the dental profession getting over to the layman, the principles underlying preventive dentistry. If diseased gums and roots are the potential cause of so many, so varied and so malignant systemic disturbances, our duty is not only to train and teach our patients these facts, but to set ourselves to the task of getting this information over to the poor and ignorant, untrained and uncared-for who know nothing of these truths and who possibly care less.

With these ideas in view, the Jefferson County (Kentucky) Dental Society spent several months' time and effort in getting up a display to show at the National Health Exposition, during the month of February.

The display consisted of models of diseased gums in a progressive stage, models of the jaw with the progressive stages of decay, models of the detrimental effect of the loss of the first permanent molar in early life; orthodontic display, a radiographic display, and an educational display by means of posters and charts.

The large models which were used by the Jefferson County Dental Society, the arch and teeth were about ten times normal size, thus large enough to observe all details at a distance of several feet. There were nine models in the set, starting with a perfect and normal model of a lower set of teeth, with the gums, lip and tongue, represented on the model painted and stained to represent the normal healthy tissue.

Model 1 shows the teeth with the food plaques and stains on them, just such a set of teeth that one would say, had not been brushed upon arising and at bed time. Model 2 shows the beginning of formation of tartar with recession of gums, and a congestion of the mucous membrane of the mouth. Model 3 has more tartar around the necks of the teeth, encroaching upon the periodontal membrane, with the gum congested, swollen and red; mouth in just such condition in this stage that if given careful conscientious routine prophylactic treatment, the response would be nothing short of miraculous. Model 4 of this series, shows a good many of the teeth already lost, with the others staggering in every direction, and such an extensive loss of the periodontal membrane and surrounding bone tissue that there is a futile hope of making useful the remaining teeth. Model 5 is the edentulous jaw.

The series on decay begins with Model 1 small cavities in the approximal surfaces of incisors, and pits and fissures in bicuspids and molars, at which stage they may be easily filled, and the teeth restored to normal usefulness; Model 2 shows these cavities enlarged, and their possible encroachment upon the pulp, with the attendant symptoms of pulpitis. Model 3 of this series, shows an abscessed condition of some of the teeth, the loss of several others and Model 4 shows the edentulous jaw.

The big idea in these two series of models, is to educate the layman that gum diseases and pyorrhea lead to the loss of all of the teeth if not interfered with; likewise decay allowed to progress without any effort made in the way of restoration, leads to the edentulous jaw. Driving home to the layman these two conditions as portrayed by the large models, are not only preventable in the large majority of cases by proper prophylactic measures, but in any case if taken in time by the conscientious and intelligent dentist, can be successfully handled and cured.

Another model showing the mechanical defect in the early loss of the first permanent molar, about ten times the normal size, was particularly interesting and instructive, and certainly was a great adjunct in the educational propaganda that has been and is being taught in our public schools by the public school nurses and by the public school physicians and dentists. This model was an articulated half mouth; beside this stood an articulated half mouth showing a perfect occlusion with the first permanent molar in a normal position. Placarded in large type over these two models was the following: "Save the First Permanent Molars."

The orthodontia side of dentistry had as its educational part of the program a show case in which were displayed models of preventable cases of orthodontia; models showing malocclusion caused by habits, too early and too late extractions, adenoids, and mouth breathing, each being placarded. Models showing proper spacing and development in temporary set, and lack of spacing and development in temporary set, were shown and placarded. Posters were also displayed giving salient points on orthodontia.

The radiographic display was gotten up by three of our local radiographers, and was interesting and instructive show-

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ing the characteristic things that are usually found by radiographic examination of the oral cavity. On display were some skulls, in which there were teeth which has been abscessed, showing the loss of the alveolar process over the apices of these teeth.

The educational program as placarded on the back of the booth, arranged in an artistic manner, consisted of the following basic truths. These placards were printed so they easily could be read twenty feet away.

"Some basic facts you should know about your teeth, with method of brushing the teeth."

"Give attention to your teeth." "Keep your mouth clean." "A few minutes now may save you years of regret later on." "Upper teeth brush down, reaching the gum first; lower teeth brush up, reaching the gum first." "Scrub your tongue, flush your mouth thoroughly with pure water afterwards." "Each individual should have his own brush; keep the brush clean with soap and water." "Use a moderately stiff brush."

"(1) Most people do not appreciate what a serious matter a decayed tooth may become.

(2) It is not only painful; it may undermine the general health.

(3) The most important tooth is the first permanent molar, which comes in back of baby teeth.

(4) It is the first permanent tooth to come, and usually the first tooth to decay.

(5) Choose your food carefully; then chew it thoroughly. Digestion begins in the mouth with chewing. If the work is not done there, the stomach has to do more than its share, is overworked and is weakened. Good chewing helps to keep the teeth clean and healthy.

(6) The first step in preventive medicine lies in the mouth—(Mayo). The mouth is the gateway to the body—shut out disease by keeping a clean mouth.

(7) There is no tooth the maintenance of which warrants the jeopardy of health.

(8) Deposits of tartar are a cause of pyorrhea. Toothache, pyorrhea and decay are preventable.

(9) Care of the teeth aids children's progress in school. If a child is brought up until the age of sixteen with a perfect set of teeth, he will in all probability go through life without many dental ills. Don't neglect children's first teeth.

(10) Save the first permanent molars.

(11) There is a free dental clinic for children at the City Hospital where children unable to afford private dentists can have work done.

(12) Good teeth mean good health. Good teeth are necessary to good digestion.

(13) A child with irregular teeth is not apt to outgrow the deformity. After a tooth aches it is usually too late to save the pulp. Preserve the pulp.

(14) Dental diseases cause systemic diseases such as rheumatism, arthritis and heart disease. Good dentistry can add ten years to a human life.

(15) The nation will some day learn that success with neglected teeth is almost impossible—(Ryan).

(16) One single tooth can make the difference between business failure and success—(Ryan).

(17) A bad tooth uncared for constantly gets worse.

(18) Know that your dentist properly sterilizes his instruments.

(19) A clean tooth does not decay.

(20) A clean mouth is one of the best preventives of tuberculosis.

(21) Your dentist should do your dental x-ray work and make the diagnosis.

(22) Consult your dentist at least twice a year.

(23) General health is improved and susceptibility to decay and pyorrhea lessened by having crooked teeth straightened.

(24) General systemic disease as caused by diseased teeth has been discussed a great deal in the last few years. The layman is constantly hearing of some friend who is having teeth extracted on account of heart, kidney and liver conditions, or perhaps rheumatism and neuritis. These general systemic conditions are produced by teeth that have had the pulps removed and are infected at the root ends. This pus, bacteria and toxins are absorbed into the system through the blood stream and lymphatics. They may lodge in any of the organs of the body and cause them to break down, or completely impair their function. These same general disorders may be caused by diseased gums (pyorrhea) or teeth that have not erupted, particularly impacted third molars."

Infected tonsils, sinuses, adenoids, sluggish intestinal tract and diseased glands, may cause the same general systemic diseases that are caused by diseased teeth and gums.

Have your mouth x-rayed by your dentist and know whether there is a potential factor of disease in your mouth, if you are sick and the cause is not located otherwise.

The above basic truths were printed in a bulletin together with the method of brushing the teeth. Of these bulletins, some thirty thousand were distributed at the booth; the booth was artistically decorated by a window decorator, and was further beautified by potted plants, draperies and rugs.

The Jefferson County Dental Society fostered this exhibit, raised the money to make it possible. In the neighborhood of one thousand ($1,000.00) dollars was spent in putting it on. A great deal of newspaper publicity was given it during the week of the Health Exposition. One afternoon and evening was given over to lectures on oral hygiene. Moving pictures and a toothbrush drill were very ably managed by a dentist of our city.

Otto U. King, Secretary of the American Dental Association gave a very instructive lecture to two thousand people, on cancer as caused by oral conditions.

Requests for this exhibit have come from all over the state, and a good many places outside of the state. It is the purpose of the Jefferson County Dental Society, in which county Louisville, Kentucky is located, to use it as an educational exhibit in the public schools, and departmental schools, display it in the public libraries, and at our annual state fair which meets in this city, thereby reaching thousands of people from the country and country districts which would otherwise be impossible to reach.

Dentistry as a profession is nearly seventy-five years old, and yet we reach only ten per cent of the population of this country for any service except the extraction of teeth.

While the automobile industry is less than twenty years old, more than one-half of our population is reached directly or indirectly by the automobile. Dentistry is a necessity, the automobile is a luxury.

If the layman can be trained to take such care of his oral cavity, that the work of the dentist would be greatly reduced, then it would be possible for our noble profession to occupy a higher place in the life of the community, and fulfill in a greater measure, their responsibility, in the communities in which they live.

A BASIS FOR ORGANIZING AND CONDUCTING RESEARCH FOR ANY PHASE OF DENTISTRY

By H. B. WASHBURN, D.D.S., Saint Paul, Minnesota

(Read before the American Dental Association, Los Angeles, California, July 17-21, 1922)

I WILL discuss in this paper the following subjects in the order as given: organization, research, dentistry. The definition for organization is, a systematic plan for carrying on business. In the case under discussion, research is the business. Therefore it would seem logical that only those desiring to engage in real research work should be members of a research organization. The fact is called to your attention that with all organizations in dentistry to whom the word research is given or implied, practically very few are conducting any true research. They are in the main, study clubs learning some particular method or technic.

Each year there are one or more groups from the membership of the American Dental Association starting out as research bodies in some one phase of dentistry. The only qualification for membership necessary as a rule is that one be a member in good standing of the American Dental Association. Sometimes the idea of some organization is born in the minds of a few men of some specialty in dentistry and they in turn invite a few men with whom they are acquainted to join in forming what they have in mind, usually without any definite plan worked out. To date there has been very little real good come from any such group. It may be the plan of organization is to blame.

Investigation of scientific research bodies outside of dentistry reveals one large outstanding feature. They have a parent body behind them, also an object for which to strive. A definite plan or organization is mapped out first, around which are built entrance requirements. In discussing this with Otto U. King he gave me the germ of an idea which I have worked out as follows. When a group of men in the American Dental Association think better work could be done along a certain line, by concentration of a few men particularly interested, let this be made known to its President. He would then appoint a committee to prepare a constitution and by-laws for this group in which the object and plan would be specified, including entrance requirements. This to be presented to the House of Delegates and if approved by them would be in the nature of granting a charter, protecting the name chosen for the group for the life of said charter. Then all men able and willing to meet the requirements by signing the constitution would become members. This group would then elect officers and begin to function.

To state concisely such a plan should be mutually beneficial as follows:

First, the American Dental Association as now organized and functioning exerts powerful influence for good. This influence is bound to grow in proportion to the number of active members. Therefore, it seems logical that sections or societies formed with the idea of concentrated work in one field, will profit by having it as a parent body.

Second, this works conversely as well. There may be a danger by having so many specialized groups working independently which may in time split the American Dental Association to the point of possible disorganization. However, in order that there be equity in such a relationship, men interested in the new group should be the ones to draw up the constitution for their own group. The American Dental Association must be careful not to incorporate any rules except common sense plans for mutual benefit.

In the one week of the annual American Dental Association meeting there is not time to do what must be done in research for each phase of dentistry. Therefore the Association should foster the best possible help as a parent body, not any narrow-minded, prejudiced proposition, but something big enough to appeal to big men.

Assuming now that the organization has been completed, what is it we are set out to do? Research. What is research. Research is sustained effort in search of knowledge. Again system must enter, in order that we gain what we seek without lost effort. There must be a beginning, and in the case of dentistry this would be a knowledge of fundamental subjects. As such we have biology, histology, anatomy, physiology, pathology and mechanics. Mechanics a dentist must have within himself, the rest can and must be learned to the point of practical application. Perhaps one of the greatest results for good from a correctly organized and functioning research group would be the knowledge that mechanical ingenuity in dentistry, while necessary, is only the means to an end. Fundamentals as above listed must be taken into consideration in *every* reconstruction case in order to give one hundred per cent service.

This statement will not attract very much attention at this time, I know, because it will take time for a sufficiently large number of men to be educated to its true significance.

Research we say is sustained effort in search of knowledge. In our case knowledge of what? Is not our problem as dentists the masticating apparatus? How do we, each one of us, consider this problem, from the standpoint of mechanics only? How much do we remember of the anatomy, physiology and histology of the head and neck? Quite vague, is it not, surely not definite enough for application in our work.

The living, functioning human being is our problem. We must be thoroughly alive to this fact and must be well grounded in each and every one of the factors entering into this problem, above listed as fundamentals.

A normal individual with normal occlusion, no caries, no pathology in bone or soft tissue, with resultant normal physiological function is our ideal or starting point. Opposed to this we find almost unlimited variation or deformity. A large majority of dentists view such a problem *entirely* from the mechanical side. *Dentists must be made to see that dental ills from childhood through life are primarily disturbances of living human structures.*

In order to recognize the disturbance and decide how to correct, we must all have a clear understanding of biology, histology, anatomy, physiology and pa-

thology, especially as related to the head and neck. There are men in our profession as well as in the medical profession today calling attention to specific troubles in our field of work, but we do not quite get what they are talking about, because our fundamental knowledge is so weak.

In order that we may get quick results, a partial denture research society could begin at once to help not only their own members, but the entire profession by committee work, having a committee for each fundamental subject, with their object the preparation of a compend which would contain the essentials of the subject assigned as applied to dentistry. Such work should be completed between one annual meeting and the next. At this meeting the general assembly would pass judgment on the result of all committee work, and if approved there would be available material for study by every member of the group. At the end of another year there would be a different minded group getting together.

If thorough study of all compends has been given by every member then the problem of the living functioning human masticating mechanism could be considered from a correct basis and all would understand each other. Mechanics would then take its proper place, the means by which we correct what our previous knowledge tells is incorrect.

Compare such a plan and such a group with those operating to date. Outside of mechanics, the discussion and committee work is painful; even in mechanics the things we hear and see are largely some man's or men's opinions, very seldom with a background of true fundamental knowledge.

Our third and last heading is dentistry, or we might say dentistry and the public. Has the thought ever struck you, how much actual good gets back to the dental profession and our patients from a meeting such as this of the American Dental Association, or from any or all of the so-called research groups which meet independently of it. Think of the tremendous expense of putting on these meetings in money, time and effort. So far can we say it pays? In organizing, and carrying on the work of these groups and the American Dental Association this thought should be paramount; in order to prevent waste of time, effort and money there must be a definite object or thought around which to plan the work. Dr. Hartzell, answered it in a measure last year in planning to have the work and essays built around the slogan, "Add ten years to human life." We should go farther, however, because dentistry and the public are clamoring for practical results.

Why is it that dentistry is different in the east than the west? Men's opinions differ, you say. True, but have we all the same foundation for basing our opinions? Knowledge of fundamentals again. Our colleges are at fault to the extent that these fundamental subjects are taught in order to pass examination. No one of the instructors afterwards seems to see the need of following up the earlier knowledge gained by showing its practical application. As examples, in the first years of the dental course students learn dental anatomy as well as general anatomy. After the prescribed course and the examinations are over, if the student passes the examination the subject is dropped. It does not come up again until the State Board examination. Dental anatomy is sometimes referred to in the later work of the student, but its application, especially in crown and bridge work, is not emphasized.

My point is that all fundamental subjects taught in colleges should be taught from the standpoint of application, otherwise what good are they?

Again let us consider how much real

tangible good the dental profession and the public get from the meetings of the American Dental Association and the various groups organized under the name of some phase of dentistry. Dentists as well as patients are asking questions which should be answered. As examples we have the Gysi, Hall, and Monson schools in denture work. Each has a following, the man in practice is up a stump to know which is near enough right to tie to. Practically all discussion on this phase or at least lack of finding a common ground is due to a lack of training in fundamentals.

We have men with followers advocating each his own pet removable type of bridge or denture. The man in practice wonders who is right and the only answer he gets from the literature is discussion of tissue change, which is superficial, instead of a discussion of the regional anatomy. A brief study of the osseous anatomy of the head will open one's eyes to the great responsibilities, we as dentists assume, when we try to restore occlusion. The mandible depends entirely upon the occlusion of the teeth for its relationship to the rest of the bones of the head. We have discussion of technic without a basic knowledge of mechanics. At any rate the group giving out the information has not gone into the subject thoroughly enough to be able to tie all these important fundamentals together in a logical and practical manner. We hear discussed tooth movement from the standpoint of fixed or removable construction with no consideration for balanced occlusion. All the way down the line without a single exception if you will analyze carefully dental teachings today, undergraduate as well as postgraduate, there is a lack of fundamental knowledge and practical application of same—too much of the superficial and too much men's opinions.

As a suggestion for obtaining practical results quickly, I offer the following: Instead of one or more men getting together and inviting as many of their friends as they choose, to form a partial denture society without any special requirements except perhaps reputation, let there be drawn up by a committee appointed by the President of the American Dental Association a constitution, setting forth the object for which the group is to work and requirements for entrance.

One of the requirements might be that the first year a member must submit to the secretary, casts and radiograms of a mouth in need of reconstruction. Casts of same mouth after work is completed. A history of the case and brief discussion of diagnosis, and methods of restoration. Each year thereafter for as many years as the society thinks necessary, new casts and radiograms of same case must be submitted. The secretary would be the only one who would know the dentist's name.

Do you see the possibilities of such a plan for a practical clinic after a few years? Correctly arranged in sequence anyone interested could review several years of each case and see just what has happened regardless of whether removable, or fixed or what method or technic used in any particular part of the work. Men could actually see work done in all parts of the country, and the result over a period of years, instead of taking men's word for what they are doing and what their results are. We must grant such a plan would be hard work, especially for the secretary, *but* do we want to keep on deceiving ourselves and our patients or do we sincerely desire to ascertain what is right and wrong?

It seems to me that combining such a plan with committees working out the compends, one for each fundamental subject would be at least a start in the right direction, especially with the American Dental Association back of it all.

GOLD CASTING[1]

By OSCAR E. HARDER, Ph.D., Minneapolis, Minnesota

I HAVE read with interest the communication by John S. Shell in the March issue of the *Journal of American Dental Association* entitled "Gold Casting—With Special Reference to Cast Gold Inlays." It is indeed pleasing to see this application of the theoretical principles of metallography to the solution of a very practical problem in the field of dentistry. As a means of contributing somewhat to the general work in this field, I wish to present some discussion of those parts of Shell's paper which relate to the equilibrium during freezing of different alloys, and to the gold-copper constitution diagram.

On page 197 of Shell's paper we find this statement in regard to the solidification of platinum-gold alloys: "If complete equilibrium were established in an alloy containing six per cent platinum, the first part to solidify would contain approximately thirty per cent platinum, while the remaining alloy would be richer in gold. This is probably not the case, due to the fact that solidification takes place rapidly and there is not time for the alloy to reach a point of equilibrium." This statement does not appear to me to be adequate.

If we consider Figure 1, which is the gold-platinum equilibrium diagram according to Portevin (Rev. de Met. Mem. 5, p. 192 [1908]), and we choose for consideration an alloy containing ninety per cent of gold and ten per cent of platinum, and we further assume a condition of complete equilibrium, we find the composition of the first solid to form is shown by drawing a horizontal line from the intersection of the concentration vertical, ninety per cent Au—ten per cent Pt, and the liquidus at p till it cuts the solidus at s. This gives an alloy containing thirty-nine to forty per cent Pt. This means that the first solid to form under these conditions will contain nearly forty per cent Pt and that the beginning of solidification will take place at about 1210°C. If now we consider the conditions of equilibrium at a temperature of 1150° C., the intersection of this temperature horizontal with the liquidus at m shows the composition of the melt, and its intersection with the solidus at s′ shows that the composition of the solid, which are respectively, about ninety-five per cent Au and five per cent Pt, and about seventy-five per cent Au and twenty-five per cent Pt. If we make use of the lever arm relations, which make it possible to calculate the per cents of melt and of solid at this particular temperature, we find that the melt : solid :: 15 : 5, or in other words, about twenty-five per cent of the entire alloy has solidified and about seventy-five per cent of it is still in the molten condition. This method of calculating the per cents of the phases present at

[1]Discussion of "Gold Casting—With Special Reference to Cast Gold Inlays," by John S. Shell, *Journal of The American Dental Association*, March, 1923, p. 187.

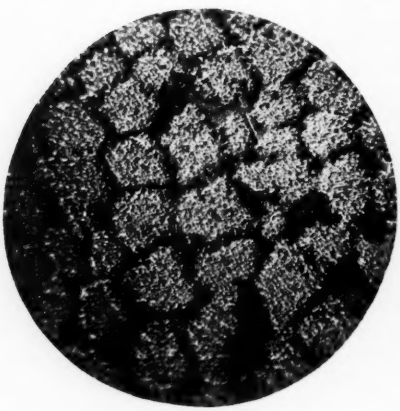
any given temperature may be more easily understood from the following equations:

$$(1).\ \text{Per cent melt} = \frac{P'S' \times 100}{MS'} = \frac{15 \times 100}{20} = 75 \text{ per cent.}$$

$$(2).\ \text{Per cent solid} = \frac{M\ P' \times 100}{MS'} = \frac{5 \times 100}{20} = 25 \text{ per cent.}$$

If we assume complete equilibrium throughout the freezing of this alloy, the composition of the melt varies along the liquidus line until finally it comes to have only about 2 per cent Pt and ninety-eight per cent Au in the last melt to solidify at M′, whereas the composition of the solid has varied along the solidus

PLATE I



A. Gold-Silver Alloy. X600 70% Au-30% Ag by weight.

B. Gold-Silver Alloy. X600 60% Au-40% Ag by weight.

C. Dental Alloy. X500 85% Au-9% AgCu-6% Pt by wt.

D. Dental Alloy. X300 75% Au-19% AgCu-6% Pt by wt.

line from about forty per cent Pt down to the final condition where if complete equilibrium is maintained the final solid will have a uniform composition of ninety per cent Au and 10 per cent Pt. Of course, as Shell states in his article, under conditions of rapid cooling we do not obtain complete equilibrium, but I do not feel that his discussion makes it clear as to all the changes which take

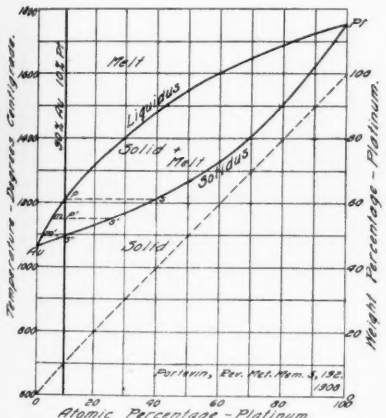


Fig. 1 Gold-Platinum Constitution Diagram.

place in the melt and solid during the solidification of this alloy if conditions of complete equilibrium are assumed at all times.

The four photomicrographs in the accompanying plate may add something to help explain the mechanism of the solidification of certain of these dental alloys. Photomicrograph A is of an alloy containing seventy per cent Au and thirty per cent Ag by weight. It was chill cast in an iron mold and the structure has been brought out by etching with iodin. The light colored areas represent the first solid to form and the dark areas are the last melt to solidify. The high melting part is rich in gold. The low melting portion, being rather rich in silver, is shown in the dark areas which are more rapidly attacked by the etching reagent. Photomicrograph B, which is also of a gold-silver alloy containing sixty per cent Au and forty per cent Ag by weight, shows a similar condition. The dark areas again represent the last melt to freeze and that portion of the material which was quite rich in silver and which, because of its high silver content, was more subject to attack by the

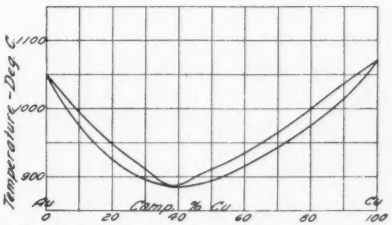


Fig. 2 Gold-Copper Constitution Diagram (Shell's Fig. 3h)

etching reagent. As stated in Shell's paper, these alloys of gold and silver exhibit only slight segregation even in the cast condition. Photomicrographs C and D are of dental alloys of the following composition:

C. Au 85 per cent; AgCu 9 per cent; Pt 6 per cent.

D. Au 75 per cent; AgCu 19 per cent; Pt 6 per cent.

Both of these structures were brought out by etching with iodin.

These photomicrographs show typical dendritic structure such as frequently taining seventy per cent Au and thirty per loys, and those portions which appear to stand out in relief are the platinum-gold-rich portions of the alloy, the first part to solidify on cooling, and the dark areas surrounding these undoubtedly represent

the copper-silver-rich material which solidified at a lower temperature. These photomicrographs of more complicated alloys have been used as illustration because such micrographs of gold-platinum alloys were not at hand. However, the relations are undoubtedly similar. An analysis of samples of different areas of these alloys would show them to have a fairly uniform composition, but at the magnification used in these photomicro-

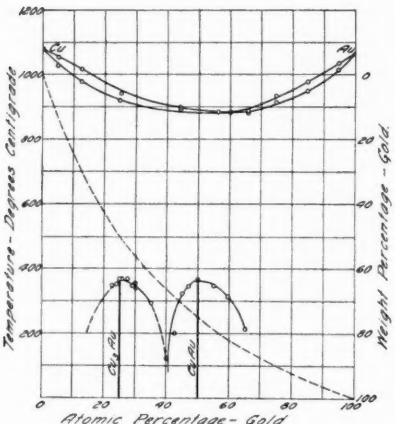


Fig. 3 Gold-Copper Constitution Diagram.

graphs it is clearly shown that they are quite heterogeneous in their composition, which results from a cooling at too rapid a rate for a condition of complete equilibrium to be established. The uniformity of these structures would be improved by proper annealing.

In regard to his Figure 3h, which is the most commonly quoted constitution diagram for the gold-copper equilibrium and which is here reproduced in Figure 2, it seems necessary to refer to more recent work by Kurnakow, Zemczuzny and Zasedatelev (J. Inst. Metals Vol. 15, p. 305-331 [1916]). According to the diagram shown in Figure 2 the gold-copper alloys represent a continuous series of solid solutions, but the very careful work referred to above has established the existence of two intermetallic compounds, Cu_3Au and CuAu, containing approximately fifty per cent, Cu

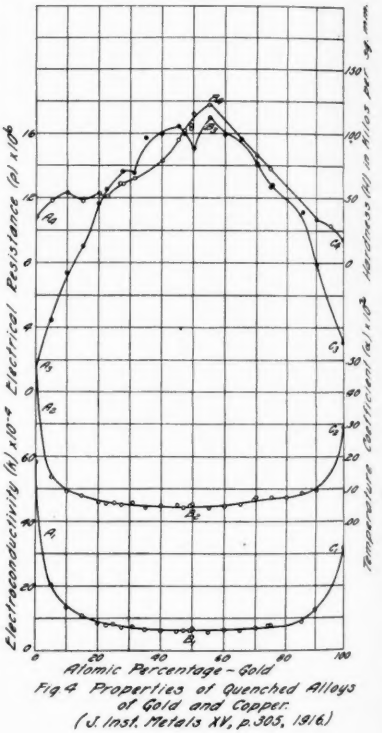


Fig. 4 Properties of Quenched Alloys of Gold and Copper. (J. Inst. Metals XV, p. 305, 1916.)

fifty per cent, Au and twenty-five per cent Cu seventy-five per cent Au by weight respectively. This more recent gold-copper equilibrium diagram is shown in Figure 3 in which the concentration is plotted in atomic per cent in order to show more clearly the intermetallic compounds. The corresponding compositions by weight can be read from this same diagram by means of the curve

drawn across the diagram in a broken line. I feel that it is especially important to refer to the existence of these intermetallic compounds because they undoubtedly have a marked influence on the physical properties of gold-copper alloys and also on those dental alloys which contain relatively high percentages of these two metals. In Figure 4 certain properties of these alloys when rapidly cooled are shown; the corresponding properties of these alloys as slowly cooled or annealed are shown in Figure 5.

In Figure 4 the curve A_1-B_1-C_1 shows the electrical conductivity, K x 10-4 of these alloys in the quenched condition. Their temperature coefficient is shown in curve A_2-B_2-C_2. Their electrical resistance, Px10^6, is shown in curve A_3-B_3-C_3, and their hardness, H in K/sq. mm. in curve A_4-B_4-C_4.

It will be observed from these curves that we have essentially the typical U-shaped curves for the electrical conductivity and temperature coefficient, which are characteristic of continuous series of solid solutions. The electrical resistance and the hardness curves show maxima which, likewise, indicate a continuous series of solid solutions.

On the other hand, if we consider Figure 5, the curves show clearly the existence of the two compounds. The electrical conductivity, K x 10-4, is shown in the curve A_1-B_1-C_1-D_1-E_1-F_1-G_1. The temperature coefficient is shown in the curve with the sub-script 2, electrical resistance with the sub-script 3, and hardness with the sub-script 4.

The minima in the electro-conductivity and temperature coefficient curves at points B, D and F indicate solid solutions, while the cusp in these curves at C and E represent the properties of the two intermetallic compounds. The solution at B would be Cu_3Au in copper, at D a solution between Cu_3Au and CuAu, and at F a solution of CuAu in gold.

Corresponding maxima and minima are found in the electrical resistance and hardness curves. Probably the most interesting curve to the dental profession is the hardness curve. A comparison

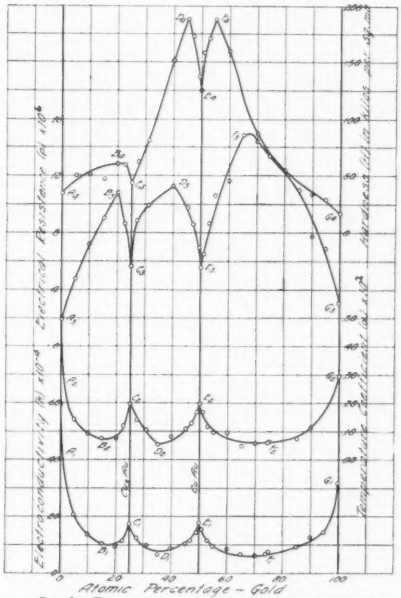


Fig 5 Properties of Annealed and Slowly Cooled Alloys of Gold and Copper. (J. Inst. Metals XV, p 305, 1916)

of the hardness curves given in Figure 4 and Figure 5 shows the marked increase in the hardness of these alloys due to the formation of these compounds on annealing. The addition of ten per cent by weight of copper to gold (90% wt. of Au = 74.37% at. Au) was found by these investigators to give rise to an increase in the hardness from 18.65 to 69.95; that is, the hardness becomes about three times greater. This is the result of the formation of a solid solution of the intermetallic compound CuAu

in gold. This has an interesting relation in connection with the properties of our gold coin which is 900 fine, that is, contains ninety per cent gold and ten per cent copper, and which alloy has a much greater hardness and, therefore, greater resistance to wear than pure gold.

The fact that these compounds do not appear in alloys which are cooled rapidly, which would be the condition of cast alloys, immediately suggests an interesting possibility in connection with the heat treatment of cast dental alloys containing gold and relatively high per cents of copper. If these alloys are heated up to a temperature of 300 to 400°C., the most favorable temperature for the formation of these intermetallic compounds, their formation will undoubtedly take place on slow cooling, with the result that the alloys will show a marked increase in hardness. It should, therefore, be possible in practice to cast these alloys and then anneal them at a temperature of 300-400°C., and slowly cool them, and by this heat treatment greatly improve their hardness, stiffness, and tensile properties.

This discussion of Mr. Shell's paper has been written entirely with the hope that it will be of some assistance in furthering the valuable work which he has so well started in his original communication.

THE TEETH AND HOW TO CARE FOR THEM[1]

By ROBERT P. DRESSEL

(To be read before school children—fifth to eighth grades)

YOUR teacher has been kind enough to let me steal a few minutes from your regular school work in order that I might tell you something which I am afraid we do not all know, but which I am sure we will all be glad to hear. I am going to tell you something about your teeth.

When you were a very little baby from about three to six months old, your mother, one day, was perhaps cleaning your mouth as usual with a soft white cloth wrapped around her finger when suddenly her finger came in contact with something sharp and upon looking into your mouth she discovered that baby had a tooth. She was so delighted that in a very short time everyone in the house knew about it. They all had to look in your mouth, feel of the tooth and some of them even placed their finger in your mouth to see how hard you could bite. You continued to get your baby teeth until you were about two years old, and if Mother Nature has performed her work properly you should have by that time all your baby teeth, twenty in all, ten in the upper jaw and ten in the lower. These teeth were to stay in place without any change until you were between five and six years of age when you would get the four most important teeth in your mouth—the teeth known as the six-year molars. There are two of these teeth on the upper jaw and two on the lower. They come through the gums behind all the baby teeth and because the little boy or girl does not lose a tooth when he gets this new one, many people think that this new tooth coming in is just another baby tooth when in reality it is one of the largest and one of the first permanent teeth to grow. These second teeth begin to take the place of the baby teeth about the sixth year.

Remember now that you have twenty teeth in your baby set. Now, for every baby tooth that you have there will be a second tooth to take its place. In addition to these twenty new teeth you get four molars at the age of six years, four molars at the age of twelve years and then between the age of eighteen and twenty you will get the most troublesome teeth in your whole mouth—what we call the wisdom teeth; and there will be four of these too. Some of you have seen a stone bridge built. You know that the stones are laid upon a wooden form in an arch position. The last stone is called the keystone because it locks into position all the other stones so that when the wooden form is taken away, the stones are in position locked in place so that the bridge will not fall. The sixth year molar in your mouth does the same work that the keystone does in the bridge, the only difference being that

[1]Thesis, College of Dentistry, University of Minnesota, Minneapolis, Minnesota.

instead of coming into the mouth last, as does the keystone in the bridge, Nature places it first so that it will take its position at the proper place and when you lose your baby teeth one by one, it will stand guard and force the rest of your second teeth into the position that Nature intended that they should take. Now if you use your toothbrushes and take care of your teeth you will have a better and more even set of teeth than if you neglect them and allow them to decay until you finally lose them.

Why should you take just as good care of your baby teeth as you do of your second ones? In your mouth, whether your teeth be in a good or a bad condition, germs of certain diseases are almost always present. Decayed teeth with their hollow cavities filled with decayed food make the best possible place for the growth of these germs. This being a fact you can easily see that with decayed and neglected teeth the germs in your mouth are multiplied by the millions and you are in danger of catching the dreaded diseases which generally attack a child during the time that he is in possession of his baby teeth, the diseases which start with the so-called sore throat such as scarlet fever and diphtheria. So you see this is one great reason why the baby teeth should be taken care of. Let me tell you a true story. I once had a friend, a little girl, just old enough to go to school. She was very healthy and bright so that she advanced rapidly and was soon in the second grade. Every morning her mother was particular to see that her little girl was dressed just exactly right. Before leaving for school she was sure that her finger nails were clean, she was very particular to see that the ribbon in her hair was tied just right but she never thought it necessary to tell her little girl to brush her teeth because she had the mistaken idea that the baby teeth were of no importance and that in a short time her little girl was going to lose them anyway and then she would get some nice new second ones. This mother continued to take care of her little girl and was most particular as to the care and cleanliness of her child's body, but entirely forgot her teeth. Things went along in this manner until my little friend had reached the fifth grade when it was noticed that she was not doing as well as she had done in the other grades. She was not as strong as she used to be; her teacher had to speak to her frequently for inattention. Why were all these things happening? Her teeth were decaying and while she had no bad toothache, those bad teeth were hurting and bothering her all the time. She could not keep her mind on her studies, her teeth bothered her at night and while they might not have kept her awake, they caused restless sleep with terrible dreams so that when she woke up in the morning she was more tired than when she went to bed. Not being able to chew her food properly, her mouth being in an unclean condition, and her loss of sleep were all responsible for the failing health of this little child. till her mother would say when her little girl complained that her teeth bothered, "never mind, mother will put something in to stop it. You are going to lose those baby teeth before very long and then you will get your nice new ones."

One day this little girl went to school as usual. It was a cold disagreeable day in November. Just before school was dismissed, it began to rain heavily and when the little girl reached her home her feet were very wet as she had forgotten to take her rubbers with her when she went to school. Wet feet will sometimes make bad teeth ache so it was not very long before these same bad teeth started to work. She was awake all night and the next day complained of a sore throat and decided she would not go to school that day. Her mother

finally persuaded her that she would be as well off in school as at home so she went. Her teacher noticed that she was very pale and upon being asked, the little girl told her that her throat was sore. As a precautionary measure and to protect the other little children in the room, the teacher immediately sent her home. That night the little girl was very sick, her little body was just burning up with fever and upon the arrival of the doctor the next morning, the mother was informed that her child had a very bad case of diphtheria. In a very few days the little child died—the little girl who a few weeks before that was alive and just as happy as any little girl could be.

Now I am going to tell you why these bad teeth that were in this little girl's mouth had a great deal to do with her death. Do you know that in the blood that is in our bodies we have two groups of soldiers that are very, very busy? One group is red and the other group is white. The red soldiers are constantly carrying the oxygen that we breathe, from the lungs to the different parts of the body and they bring back with them the waste materials that the body does not want; the white soldiers stand guard ready to protect the body from anything that might harm it. For instance, if you were to cut your finger, the white soldiers would rush up to that cut and form a wall around it to keep any bad little germs from going into it and doing harm to that part of the body. They work just the same in a sore throat—they form a wall around the soreness and try to prevent it from spreading. Now this little girl's mouth was very unclean as I have told you before. She had great large cavities in her teeth and her whole mouth had many, many times the number of germs in it than it would have had if it were clean and nice. Her health was poor and so the blood did not have as many of the white soldiers in it as it should have had. So when the diphtheria germs fastened themselves in the soft membrane of her throat, there were not enough of the white soldiers to fight them and the little girl's sickness became worse instead of better. Now children, I do not mean to say that those of you who have decayed or unclean teeth in your mouth are going to die with diphtheria but I do want you to remember this that if any of you should ever be sick with diphtheria or scarlet fever, you have a better chance of getting well if your teeth and mouth are clean than you would have if your teeth and mouth were unclean.

If you are like most boys and girls that I know, you do not think a great deal of these important grinders that you have in your mouth until some morning you wake up with your hand to your face and a terrible toothache. Then your hand stays to your face for some time while you are searching the house from cellar to garret trying to find something that will stop your toothache. After you have tried everything, mother's water bottle, cloves, toothache drops and nothing seems to help it you finally pick up enough courage to go to the dentist, climb in his chair, open your mouth, shut your eyes and have the tooth taken out. But remember—every time your tooth aches you do not need to have it pulled out. Your dentist can many times put some medicine in the tooth to stop the pain and after the pain is gone he can fill the tooth so you will have your tooth for many years after. We need every one of our teeth and we need them every day. One little boy told me once that we needed them every time we sat down to the table, meaning, of course, every time we sat down to a meal.

Let me tell you how the teeth play such an important part in keeping us healthy. The two sets of teeth coming together in the mouth form a sort of a mill which cuts and grinds our food in order to get it ready for the stomach to

handle. From two hundred and fifty to four hundred pounds of pressure is brought upon the food in chewing and sometimes little bits of food are forced into the spaces between the teeth and if these little bits of food are allowed to remain there for several hours, they begin to decay and trouble in several different ways is going to be the result. Decayed food in the mouth is poisonous. If you ate decayed meat or vegetables you would expect that they would make you sick. Now if your teeth are unclean, every time you swallow your saliva carries from between your teeth these bits of old food. Every time you take some clean food into your mouth it is mixed with these pieces of old food before it goes to the stomach. Now you can see that constant swallowing of this poisonous matter from lodgment places between the teeth will poison the rest of the body and cause sickness.

We know that if we leave this food rest against the surfaces of the teeth for any length of time we are going to have decay and a cavity will start in the tooth. This cavity is going to grow deeper and deeper until it reaches the center of the tooth and hurts the nerve. And that is about the time that you begin to look for the dentist and have him pull it out for you. What has happened to you after he has pulled your tooth for you? You have taken away just that much of the grinding and cutting surface of your teeth and you are not able to chew and cut your food as well as you were before the tooth was pulled.

Unless the food is properly chewed the full amount cannot be digested and a large part of it may pass through the body without feeding it. You might eat a pound of food at each meal but if you do not chew it properly you will be starving your body without really knowing it. So don't hurry through your meal. Take plenty of time and be sure that you chew your food long and well.

Now I am going to tell you how you can keep your teeth and mouth in a nice healthy condition. But first I want to ask you a question and I want you all to answer me truthfully. How many of you washed your faces before you came to school this morning? Well, that's fine. All of you washed your faces. Now, how many of you brushed your teeth before you came to school this morning? Well, that's fairly good but there are quite a number of you that did not do so. Now I think that if you are going to omit one of those cleanings you might better clean your teeth and let your faces go dirty. But I would not omit either one of them if I were you for if you do not wash your face it will look badly and if you do not brush your teeth it will be bad for you in other ways. If I were you I would make an honest attempt to clean my mouth and teeth after each meal and also just before you go to bed at night. If you do not brush your teeth during the day be sure and brush them just before you go to bed at night. When you are sleeping with a mouth full of particles of food which are starting to decay, here is what happens. The cheeks and the tongue are not rubbing the teeth and gums as they do when you are awake. The saliva is not flowing to give the teeth the bath that Nature intended it should and the germs that are always present in the mouth are doing their worst because they are not being disturbed.

I have a new toothbrush here with good stiff bristles and just the right size for you children to use. If some little boy will come up here by me I will show the rest of you how you should brush your teeth the right way. (He shows the children how to brush their teeth properly, talking as he goes along and then asks the little boy to take the brush and show the rest of them how he would brush his teeth correctly.) Be careful not to brush your teeth crosswise. It does no good and all you are doing is to brush and pack the particles of food

more tightly between the teeth. The gums should be brushed quite as well as the teeth—it quickens the circulation of the blood in them and makes them more healthy. If your gums bleed when you first brush them, brush them carefully. Little by little they will become more healthy until the more you brush them the better they feel and in reality the better they are.

Here are two short rhymes you might like to hear:

1.

Jack Spratt could eat no fat.
His wife could eat no lean.
And do you know the cause of that?
Their teeth were not kept clean.

2.

Mary had some little teeth.
But you would never know
That underneath that greenish stain,
They were as white as snow.

But Mary got a brush one day
And brushed them up and down
Until they were as white and clean
As any girl's in town.

Now Mary has some little teeth
That shine like little pearls
Because she keeps them white and clean
Like other little girls.

When conditions are such that your toothbrush is not at hand, a piece of waxed floss or silk thread can be rubbed and drawn through between the teeth. Our good manners will not permit us to use toothpicks but if they are to be used at all, they should not be of wood but a quill either of a duck, goose, turkey, or a chicken. It is much better though to use your toothbrush or your silk floss or thread. In forcing the silk thread or floss between the teeth, do not snap it down on the gums so that it cuts them and causes them to bleed. Work your thread gently up and down on all sides of the tooth. In this way you will get out any particles of food that happen to be lodged there and you will also polish those surfaces of the teeth making them nice and smooth. Go over every tooth in your mouth in this manner and after you have done all this rinse your mouth out with water or some mouth wash that you may have. You have then done all you can until you can again use your brush.

In closing, I want to say to the boys, if you want to be good athletes and play football, basketball, baseball or any other sport, you want to take good care of your teeth. Why? Because to be a good athlete you must have good health and in order to have good health you must have good teeth. Decayed and aching teeth have no place on a football field. Poor health brought on by the improper chewing of your food and improper digestion will not win for you a place on the baseball team. You will have to content yourself with sitting by and watching your classmates win your school battle for you.

To the young ladies I would say, if you want to be successful in singing, reciting, debating, athletics and many other things, care of the teeth will aid greatly in bringing you that reward. There is nothing more becoming a young lady, nothing more beautiful than a good well kept set of teeth. If nature has not blessed you with a beautiful face but if your teeth are well cared for, you will be admired by all who know you. If you will form the habit of caring for your teeth now, in later life it will be no burden to you and you will reap the reward in healthier bodies, you will grow up to be better women, both physically and morally, a credit to yourselves, to your parents and to the community in which you live.

This has been pretty long, I know, and I do not expect you to remember everything that I have told you but if you do not remember anything else, remember these two things. When you eat, chew your food and chew it long and well; *and don't forget to use your toothbrush.*

THE DENTAL EDUCATIONAL COUNCIL OF AMERICA

By JOHN V. CONZETT, D.Sc., D.D.S., F.A.C.D., Dubuque, Iowa

THE Dental Educational Council of America was called into existence by the National Dental Examiners Association overtouring the National Dental Association and the National Faculties Association, at their meeting at Old Point Comfort in 1909, inviting each Association to appoint five delegates to meet and organize a council, which was to be known as the Dental Educational Council of America. In compliance with that invitation the three organizations named above, appointed five delegates and empowered them to organize such a body.

The first president was Charles P. Pruyn of Chicago and Henry L. Banzhaf of Milwaukee, secretary-treasurer. The first two or three years of the organization was spent in attempting to find a point of attack of the problem before them. Dental education at that time was in a very chaotic condition. It is true that the National Faculties Association was in existence, and was doing good work, but its edicts lacked the power of enforcement, and entrance requirements, curriculum, and conditions of graduation were about as each individual school elected to maintain them, with the result that there was little harmony between the several schools either in their courses of study or their product.

With this condition in mind the Council decided to attempt the unification of entrance requirements, curriculi, courses of study, the time required to complete the course, and conditions of graduation. In addition to this it was felt that a unification of the dental laws in the various states should be attempted with the end in view of an ultimate general reciprocity of licenses to practice dentistry in the different states.

The work was necessarily slow at first and some of the colleges looked with scorn upon the attempts of the Council to regulate their affairs, and many of them flatly refused to accept its suggestions. Despite this lack of co-operation on the part of the schools that most needed the influence of such a body, but supported by the best elements of the schools in the country, the work went on, the entrance requirements were made public and the State Boards made them effective by refusing to examine men that were graduated without the preliminary scholastic requirement. The matriculant was required to have a certificate or diploma from a high school giving four years of instruction with fifteen Carnegie units showing that he had completed the course, or take an examination before some competent authority and pass with the above credits. This was a step in the right direction but was nullified in many cases by schools falsifying the returns or deliberately hiring some corruptible official who would prostitute his calling by issuing credits to prospective students, with or without an examination who had not the slightest

semblance of the required education. Several schools were caught at this nefarious practice and by the efforts of the Council, making public their practices, were compelled to either go out of business or to completely reorganize their schools upon an honest basis.

But it was a difficult matter to compel obedience to the suggestions of the Council for all of their work was, perforce, suggestive, for they had no police power. The only whip they had to enforce their rulings was that given them by the National Examiners' Association, who voted not to examine any of the product of a school that did not live up to the requirements of the Dental Educational Council of America. The National Dental Association and the National Faculties Association gave the Council the benefit of their moral support and the financial aid that was necessary to carry on the work. But despite the splendid support given by the parent bodies it was found impossible to meet the situation which arose when a school in any state decided to ignore the demands of the Council, and was supported by the Examining Board in that particular state. Many of the Boards were political, and anything that the powers wanted, the Board allowed. So the product of those schools, which were a disgrace to the dental profession, and a menace to humanity, continued to function because their graduates were admitted to examination, and were given certificates to practice in the states in which the schools were located. During the World War the medical department found that there was a decided disparity in the product of the various dental schools. Many of the graduates were not qualified to practice, in the opinion of the authorities, and in order to protect the men in the ranks, that would have to submit to the operations of the dental officers, it was found, that many of the dentists admitted to the army, had to be given additional instruction, in order to qualify them to perform their duties. When this matter was called to the attention of the Surgeon-General he called the members of the Dental Educational Council of America to New York, and through his Aids, Colonel Arnold and Captain Waite, informed us that he had decided to recognize the Council as the authoritative body in Dental education and told us to make a survey of the Dental schools of the United States, and to classify them as A, B and C. We were told that the product of the schools in classes A and B would be accepted by the war department and would be given commissions, but that the product of schools classed as C would be required to go into the ranks in the draft. This immediately gave the Council the club which it had so ardently desired, and almost immediately seven of the offenders against dental education were put out of business.

The schools were classified at this time as a result of a questionnaire which was put out, supplemented by the knowledge that the various members of the Council had of the truth to the answers submitted. The first classification was admittedly open to considerable criticism, but considering the time given the Council to do the work, and the exigencies of the war period, the failures in proper classifications were very few indeed. Immediately after this classification which was in a way tentative, a more intensive inspection of the colleges was entered upon. Committees from the Council visited the schools during their educational periods and inspected the plants, equipment, teachers, curriculi, the work of the students, the state board records, and the administrative offices. As a re-

sult of this inspection a considerable change was noticed in the next classification. The Council also began to better understand its function and the administration thereof, and a decided betterment was noticeable in the functioning of the Council and in the results it obtained from its suggestions. The better schools were now giving whole-hearted support to the work, and the influence of the Council grew apace.

At this time the Carnegie Foundation for Teaching decided to make a survey of dental education, and selected Dr. Wm. J. Gies to head the work. He has been a teacher in Columbia University and head of the department of chemistry for many years, and in addition to his natural and scholastic attributes brought to the work a sympathetic interest by reason of his researches in dental problems in collaboration with a committee appointed for that purpose by the New York State Dental Association. In addition to this Dr. Gies has for many years been the Editor of the Journal of Dental Research and of the New York Journal which preceded it, so he came to the work remarkably well equipped for the task.

The Carnegie Foundation through Dr. Gies invited the Dental Educational Council of America to co-operate with them in this survey, and in doing so recognized the Council as the authoritative body in dental education. This last, and most serious inspection was begun in October, 1921. An intensive survey was made of every school in the United States and Canada. The schools in Canada were not inspected officially by the members of the Dental Educational Council. Anything of that kind would have been the highest kind of presumption, but they did co-operate with Dr. Gies in the survey of the Canadian schools at the express invitation of the schools themselves. For they were not slow to recognize the tremendous importance of the movement and gladly availed themselves of the opportunity thus presented.

The schools were inspected by a committee of three men from the Council together with Dr. Gies. Dr. Gies visited every school in this Country and Canada. The committees were selected by the president of the Council from volunteers who would make known their willingness to inspect any group of schools and from these volunteers the President selected such men, as in his opinion, would bring to the task in hand the best available talent. The selection of the committee was always submitted to the deans of the schools to be inspected and the dean was given the power to veto the selection of any or all of the inspection committee. This veto power was utilized by some of the deans in several instances, for reasons best known to themselves, and their reasons were in the main, not questioned. If any man was a person not acceptable to the authorities of the school, that usually settled it, and another man placed on the committee. This was for the purpose of having an harmonious attitude between the schools and the inspection committees.

It must be admitted that the method, while the best that was practicable, is open to objections. The personal equation must enter into any proposition of this kind and the sending of different committees around to different schools and then attempt to correlate the data thus gained and make a classification, must lead to some injustices. For it is conceivable that one school will be visited by a committee that is composed of men that are hard inspectors and know their business, and the school that that committee visits is given a rigid and intelli-

gent inspection while another school is visited by a committee composed, for the most part, by novices in the educational field, and while they are honest, and as efficient as they know how to be, it is conceivable that the report that such a committee would make, would not bear a semblance of the efficiency of a report from the first named committee. This criticism has been frequently made and is well taken, but to meet that objection, each committee was balanced as nearly as it could possibly be by men that were experts in the game, and men that were more or less novitiates in the educational field. This together with the fact that Dr. Gies was a member of every committee, and personally inspected every school, and had a hand in the making of every report, vitiated the criticism to a great extent. Nevertheless it is admitted that the ideal would be the employment of a paid secretary who would make it his business to visit the schools at regular and frequent intervals, and call to his assistance any member of the Council, and then report his findings to the Council and from time to time reclassify the colleges according to his findings supported by the ratification of any committee that the Council might see fit to check up his report.

This is the goal toward which the Council is working and will be the greatest step that has ever been taken in dental education. The only reason that it has not been done up to the present time, is the one of financing the proposition. The American Dental Association could do no more constructive work for dentistry in any direction, than in making possible this dream of the men who have been working and sacrificing for the good of the cause.

It might not be the part of good taste to refer to the sacrifices that have been made by the members of the Council in the work that they have done and are doing for dental education, and yet it is only fair that the members of the profession should realize something of the tremendous task which has fallen to the lot of these men, of the time they have taken from their practices in order to attend meetings in different parts of the country, and to inspect the colleges located in every part of this vast country of ours.

Nearly all of the men have given from thirty to sixty days a year for the last three years in attending meetings in arranging for inspections, in perfecting the "Minimum Requirements" and in hearing and judging the reports of the various committees. All of this time and all of this work has been given without money and without price. Nothing but the good of the profession and the consciousness of a great work accomplished for humanity would or could have induced these men or any similar body of men to make the sacrifice of time, money, practice and convenience, that they have made for the good of the cause.

The work has been accomplished. The task has been completed as far as this particular inspection is concerned, but the work has only begun. Dental education is only in its infancy. All education is in a state of flux and whether the flow shall be for the better or the worse for civilization depends upon the earnest intelligent effort of all honest men that have for their purpose not personal aggrandizement, not financial gain, nor scholastic position, but men of vision and intelligence who are willing for the sake of the future, to forget self, and put the best they have of thought, or effort, into a constructive policy that will take education out of the hands of men of mercenary or selfish tendencies, and place it in the hands of men who have no thought but that of

the advancement of the highest goal of civilization; the education of the coming race.

Classification of the Dental Schools of the United States

By the Dental Educational Council of America July 1, 1923

Class A

University of Southern California, College of Dentistry, Los Angeles, California.

Chicago College of Dental Surgery, Chicago, Illinois.

Northwestern University Dental School, Chicago, Illinois.

University of Illinois, College of Dentistry, Chicago, Illinois.

State University of Iowa, College of Dentistry, Iowa City, Iowa.

University of Louisville, College of Dentistry, Louisville, Kentucky.

Harvard University Dental School, Boston, Massachusetts.

Tufts College, Dental School, Boston, Massachusetts.

University of Michigan, College of Dental Surgery, Ann Arbor, Michigan.

University of Minnesota, College of Dentistry, Minneapolis, Minnesota.

St. Louis University School of Dentistry, St. Louis, Missouri.

Washington University School of Dentistry, St. Louis, Missouri.

Creighton University, College of Dentistry, Omaha, Nebraska.

University of Buffalo, College of Dentistry, Buffalo, New York.

Western Reserve University Dental School, Cleveland, Ohio.

Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, Philadelphia, Pennsylvania.

University of Pittsburgh, School of Dentistry, Pittsburgh, Pennsylvania.

Vanderbilt University, School of Dentistry, Nashville, Tennessee.

Baylor University, College of Dentistry, Dallas, Texas.

Marquette University, College of Dentistry, Milwaukee, Wisconsin.

Class B

University of Denver, School of Dentistry, Denver, Colorado.
(Formerly Colorado College of Dental Surgery)

Georgetown University, Dental Department, Washington, District of Columbia.

Howard University Dental College, Washington, District of Columbia.

Atlanta-Southern Dental College, Atlanta, Georgia.

Loyola University, School of Dentistry, New Orleans, Louisiana.

Tulane University of Louisiana, School of Dentistry, New Orleans, Louisiana.

University of Maryland, School of Dentistry, Baltimore, Maryland.
(Baltimore College of Dental Surgery was merged with it on June 15, 1923)

Kansas City-Western Dental College, Kansas City, Missouri.

University of Nebraska, College of Dentistry, Lincoln, Nebraska.

Ohio State University, College of Dentistry, Columbus, Ohio.

North Pacific College of Dentistry, Portland, Oregon.

Temple University Dental School, Philadelphia, Pennsylvania.
(Formerly Philadelphia Dental College)

Meharry Dental College, Nashville, Tennessee.

University of Tennessee, College of Dentistry, Memphis, Tennessee.

Medical College of Virginia, School of Dentistry, Richmond, Virginia.

Class C

Cincinnati College of Dental Surgery, Cincinnati, Ohio.

Texas Dental College, Houston, Texas.

Classification Postponed

University of California, Dental Department, San Francisco, California.
(Classification postponed until September 15, 1923)

College of Physicians and Surgeons of San Francisco, San Francisco, California.
(Classification postponed until September 15, 1923)

Indiana Dental College, Indianapolis, Indiana.
(Classification postponed until September 15, 1923)

Columbia University School of Dentistry, New York, New York.
(Incorporation of the College of Dental and Oral Surgery of New York, and reorganization of the united schools, in progress)

New York College of Dentistry, New York, New York.
(Merger with New York University in process of negotiation)

Ohio College of Dental Surgery, Cincinnati, Ohio.
(Affiliated with the University of Cincinnati on July 1, 1923; early complete merger in prospect)

MERGED RECENTLY WITH UNIVERSITIES

Colorado College of Dental Surgery.
(Merged with Denver University, June 15, 1922)

Baltimore College of Dental Surgery, Baltimore, Maryland.
(Merged with the Dental Department of the University of Maryland, June 15, 1923)

College of Dental and Oral Surgery of New York, New York City.
(United with the School of Dentistry of Columbia University on July 1, 1923)

DISCONTINUED SINCE THE PUBLICATION OF THE LAST PREVIOUS CLASSIFICATION IN 1920

(1921) George Washington University, Dental School, Washington, District of Columbia.
(1923) University of West Tennessee, Dental Department, Memphis, Tennessee.

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Editorial Department

PRESENT DEVELOPMENTS IN DENTAL EDUCATION

Whatever may be said about the need of reforms in dental educational methods, the patent fact stands out that great strides have been made not only in the details of dental instruction in the various colleges but in the broad policies of the general plan and scope of dental education as a whole. From the day when the first dental school was organized in 1839 till now—not as long as the lifetime of some individuals—the progress has been stupendous.

It has grown to be quite the fashion in certain circles to "damn the colleges"—usually by men who have never taught in them or been connected with their management in any capacity. It is so much easier to tell how a thing should be done than it is to do the thing, and do it right. Then there is a great deal in actually knowing what is the right thing to do. Sometimes men who have condemned colleges in a wholesale manner have not recognized these facts. Not that colleges have not been entitled to criticism in certain respects—they have been conducted by men who are human, and have thus been subject to many limitations and many mistakes. But when the essence of the whole situation is summed up, the fact stands out that there has been more unselfish effort put into dental education than in any other single feature of our professional development.

And the outlook for the future is very bright. Within the past decade the curriculum in most of our colleges has more than doubled—not only in the number of subjects taught, but in the scope and thoroughness of detail. This is so apparent that some observing men are beginning to raise the question as to whether or not we are demanding too much of the student along certain lines. It is a very difficult matter to institute a course that is in every respect balanced and symmetrical, and in the future it may be found necessary to add something here, and lop off something there as the light of practical experience indicates.

But the outstanding fact is that from a meager course of two years of a few months each we have advanced to a well-filled course of four years of eight months each—and this soon to be extended to five years—which in itself is something for the detractors of dental education to ponder on. In addition to this, every hour—yea, every minute—of the

student's time is accounted for under our present system, and this cannot be truly said of the earlier days of college instruction.

One of the chief agencies in the recent reorganization and rearrangement of our college courses has been the Dental Educational Council of America. Its work is so familiar to the reading part of the dental profession that it is unnecessary to elaborate upon it here, but the fact should be noted that in the consummation of its labors the time and energy of its members have been devoted in the main most unselfishly to the furtherance of the ideals set up by its organizers. While it has not been infallible in all of its findings, and while at times hardship has been worked on institutions through lack of the best judgment on the part of some members of the Council, yet the net results of its labors have tended to the vast betterment of dental education and the body as a whole is entitled to the everlasting gratitude of the dental profession.

The most recent development in dental educational circles is the formation of the American Association of Dental Schools. This body was organized at Omaha, Nebraska, on January 24, 1923. It was consummated by the amalgamation of the four bodies known as the Canadian Dental Faculties Association, the American Institute of Dental Teachers, the National Association of Dental Faculties, and the Dental Faculties Association of American Universities. The unification of these various bodies into one concrete and constructive organization is an achievement worthy of note, and one which will unquestionably lead to an immediate impetus toward better things in dental education. It will eliminate many of the cross purposes which have tended to pull educational interests apart and divert them from the highest possible fruition of their destined function.

The profession therefore is to be congratulated on the formation of this splendid organization, and it should be said in passing that the chief instrumentality in bringing it about was the farsighted wisdom and diplomacy of Professor William J. Gies, of New York—the efficient representative of the Carnegie Foundation. Professor Gies has also given signal service to the Dental Educational Council of America in their deliberations during recent years, and much of their constructive effort has been due to his aid. The profession therefore is under the deepest obligation to the Carnegie Foundation as represented by Professor Gies.

If, as we must opine, the recent developments in dental education are indicative of what is to come, we may look confidently to the future for a steady growth in the great enterprise of preparing young men and women to practice our profession. And if advancement is made

along this line "it must follow as the night the day" that dentistry as a whole will rapidly enter into a new kingdom—the kingdom of a more satisfactory service.

THE RISE OF GROUP MEDICAL PRACTICE

It is no new thing to refer to the restlessness which today agitates the collective mind of the medical profession as well as that of every social class and body. Not only have those who have taken special interest in medical practice given thought to these questions, but everywhere the rank and file, the general practitioner as well as the specialist, are discussing the future of the practice of medicine. At the last annual session of the Ohio State Medical Association, Dr. Martin H. Fischer[1] of the University of Cincinnati presented some views on these problems; he called for a harking back to the past, and for a recognition of the dignified origins from which modern medicine sprang. To the development of the crowd mind, Professor Fischer ascribes most of our unfortunate tendencies; the many who would emulate the success of the few, witnessing the financial rewards of the large groups and specialists, form new groups and also become specialists, though not willing to secure the adequate training responsible for success. Both the medical profession and the public suffer through the subsequent failure of such institutions and men in the practice of medicine. The present doctor, Professor Fischer says, "has sacrificed his individuality—the thing through which alone he has gained his public standing historically or in the present. Never before has he affected a community through mass action, and it is safe to predict that through such action he never—lastingly—will." Furthermore, Dr. Fischer lays the blame for present conditions on the medical profession itself. "If the medical profession has problems, it is because it has either voluntarily relinquished what it should have held, or done badly what others have done better." The text that he preaches is the necessity for restoring public faith in the physician. The old personal relationship between physician and patient—an impossibility in the group—must be restored. Dr. Fischer likens the service of the group clinic to that of the cafeteria, in which one can serve oneself to a diagnosis as one serves oneself to a meal:

> "One starts with a numbered card and buys himself at different counters and from different men a general examination, an investigation of the throat, a roentgen-ray plate of the gall-bladder, a dental overhauling, a surgical operation, and a plaster cast for the foot. Each item carries its price, which is punched on the ticket. What the scheme takes no account

[1] FISCHER, M. H.: Whither? Science 56:405. October 13, 1922.

of is that the patient does not care whether he has Hirschsprung's disease, erythema nodosum or pseudohypertrophic muscular atrophy. What he is after is a plain statement of what is the matter with him, and whether he can be "cured" or not; also there is wanted a little appreciation of his state of mind and some understanding of the economic hardships of his family in the interim of being ill. The food counters do not carry these dishes."

"The medical profession," Professor Fischer says, "will increase or lose its public power only as the collective expression of the people's faith in the individual doctors who touch them." The greatest medical achievements were not those of men working in great organizations, but of individuals utilizing to the utmost each his own opportunities. Boerhaave changed all of European medicine with twelve beds. Corrigan rewrote the chapter on heart disease with only six, and Külz, whose work fills one-third of all the volumes on diabetes, had only two patients. It is time for the medical profession to discard the commercialism and the selling methods of the store, and to return to the methods of the fathers in medicine. It is a time for physicians with kindliness, tolerance and large understanding, the skill of hand, the skill of mind and the resourcefulness of previous generations.—Editorial, October 21, 1922, *Journal American Medical Association.*

CONGRATULATIONS ON OUR JULY JOURNAL

[Herewith are published excerpts from a few of the many congratulatory letters received at our office. We wish to thank our many readers for these appreciative messages.]

This is a brief note to congratulate you on the July issue of the *Journal.* When we remember the "Bulletin" of a few years ago and see our splendid *Journal* of today, with the July issue the best of all, we are reminded that someone must have been "on the job" during these years; and that "someone" is yourself. Again I congratulate you and express the hope and belief that the profession fully appreciates your efforts in their behalf. The standing of a profession is reflected in its literature, and the latter can only be judged by its publications. The American Dental Association has every reason to be proud of its official organ.

(Signed) JOHN P. BUCKLEY

I find the July issue of the *Journal of the American Dental Association* on my return, and I want to congratulate you upon the fine piece of work which you have done. It is an exceedingly attractive number and ought to go a long way toward advertising the meeting.

(Signed) H. J. BURKHART, Rochester, New York.

I want to compliment you on the July issue of the *Journal.* It is a *"peach"* and I also want to say that I appreciated the editorial on "The Need of Balance." This applies to the whole range of dentistry, education and all.

(Signed) C. C. ALLEN, Kansas City, Mo.

Medical and Dental News

CALIFORNIA

New Medico-Dental Building to be Splendid Structure—George W. Kelham of San Francisco has been selected as architect, and plans are rapidly progressing for the construction of the Medico-Dental Building, San Francisco's professionally owned office structure, soon to be erected on the northeast corner of Post and Mason streets. It will be approximately fifteen stories in height, and will cost over one million dollars. It will serve as an office building for representatives of both medical and dental professions, and will house in addition a library and assembly and committee rooms. The directors of the Medico-Dental Building Corporation have aimed to make this building a medical center for San Francisco.

The site chosen has been very strongly approved, according to Dr. Guy S. Millberry, Secretary-Treasurer of the Medico-Dental Building Corporation. "It was selected," he says, "both because of its accessibility to the public and because of the intrinsic value of the real estate as an investment.

Since the announcement of the plan to erect the Medico-Dental building, the directors of the corporation have been gratified to receive widespread expression of the confidence of the professional men of this city in the project, and have also received hearty indorsement by leading banks and realtors. There appears to be universal belief in the value of establishing such an institution as the Medico-Dental Building from both a professional and a business standpoint."—The Pacific Dental Gazette, May, 1923.

Los Angeles County Dental Clinics: By Henrietta McGlashan, D. H. The dental Division of Los Angeles County Health Department has grown faster than any in California. From one full time dentist it has grown till there are now three full time dentists, two dental hygienists and an oral hygiene director.

The dentist and hygienist go together, and with their portable equipment work in the schools from 9:00 till 3:30 o'clock. The hygienist gives talks on oral hygiene and cleans the teeth of children, while the dentist does the extracting and filling that needs to be done. Needless to say, no root-canal work is done, as time and equipment are not sufficient to complete the work.

The funds for the dental work come from various sources. The County pays the hygienist's and director's salary, and the dentists are paid from school board funds, fees, etc., and deficit is made up from the sale of Christmas seals.—The Dental Hygiene News Letter, May, 1923.

ILLINOIS

Educating the Public in Illinois: The Indiana State Medical Association is not the only medical organization that is attempting an advertising campaign to educate the public concerning the aims and objects of the medical profession, for we note that the Illinois State Medical Society has proposed an assessment of ten dollars upon each member, and already is soliciting volunteer contributions from its members, to defray the expenses of a newspaper educational campaign in the press of Illinois. A pertinent discussion of this subject is contained in an editorial in the Illinois Medical Journal, which is as follows:

"It is time the public is made familiar with what the science of medicine has done in the saving of human life; also made familiar with the dangers of quackery and charlatanism.

"Through glaring spectacular statements, and bought and paid for space in newspapers and periodicals, the charlatans have distorted medical facts and are

menacing the health welfare of the people by playing on the credulity of the unsophisticated.

"So brisk is trade in the cults, that even blacksmiths, carpenters, plumbers and dressmakers are being recruited to take easy courses of from three to six months' duration and hang out shingles as healers.

"At the last meeting of the Illinois State Medical Society, it was voted to fight the 'quacks' with their own medicine.

"The United States Government has found it expedient to advertise government securities in this day of get-rich schemes. Purveyors of natural resources, such as leather, wool, butter and eggs, are advertising daily the difference of their products over the synthetic wares flooding the markets.

"Medicine must retain its traditional dignity, but when the health welfare of the people is jeopardized, she must arise and expose the invaders."—Journal of the Indiana State Dental Association, June 15, 1923.

INDIANA

The Danger of the Stereotyped Curriculum: By Dr. Charles P. Emerson, Indianapolis, Indiana. "Our curriculum is overcrowded, and it contains so many subjects that only a minimum can be required in each. We touch the high points of all the specialties, and our students learn some of the tricks of therapy in each. They give a good account of themselves for the first few years out of school, but unless they mastered the fundamental clinical branches they do not grow with their subjects, but cling to the medicine with which they were graduated and even fight for legislation to prevent its further modification.

The inadequate preparation of our graduates is proved also by the quality of our postgraduate schools, the most of which are not postgraduate at all in the sense that their courses are built on those of the undergraduate years and carry the student to still higher professional levels, but are for the most part designed to bring the graduate of a few years ago up to the level of the undergraduate of today or to allow the practitioner to change his field of activity to some other specialty.

During the middle of the nineteenth century, Germany made little progress in the sciences because of the paralyzed influence of her so-called naturphilosophie. Let us break away from the applied naturphilosophie of this century and train our students to study patients. Let us limit our curriculum to that which we can teach well; get away from the dangers of a stereotyped curriculum, and graduate boys who not only are well trained now, but who can keep always abreast of the times, and lead the public as well as their patients in paths of right living.—Annual Congress on Medical Education, Medical Licensure, Public Health and Hospitals.

MONTANA

Sterilization Bill Signed: Governor Dixon, March 15, signed the eugenic sterilization bill, passed by the legislature recently. This bill provides for the sterilization of all idiots, feebleminded persons and epileptics confined in institutions, on consent of the guardian or custodian.—Journal American Medical Association, March 24, 1923.

NEW YORK

"Popularizing Health Knowledge: The Bureau of Public Education of the New York City Department of Health is planning to furnish health lectures to lay organizations on the following topics: Personal hygiene, social hygiene, child welfare, industrial hygiene, and special diseases. The lectures are available in English, Arabic, French, Greek, Italian, Polish, Russian, Spanish, and Yiddish.—Trained Nurse and Hospital Review, New York City, February, 1923."

Acceptance of Rebates by Physicians Condemned: Resolutions were passed by the New York Academy of Medicine at a stated meeting held February 15, setting forth that numerous instances had been brought to the attention of the Council and the Public Health Committee of the Academy of rebates being offered to, and accepted by, physicians from commercial laboratories, opticians, druggists and others to whom patients were referred. It was therefore resolved that "The New York Academy of Medicine condemns such practices on the part of those offering the rebates, as well as on the part of physicians accepting them, as being unethical and detrimental to the medical profession."—Journal of the American Medical Association, March 3, 1923.

A report of the work of the Maternity Center Association, New York City, from its beginning in April, 1918, to December 31, 1921, has just been issued.

The objects of this association, as

formulated in the report, are to teach the public the vital importance of adequate maternity care, and to secure, in co-operation with all existing agencies, such care for every woman in Manhattan. The results of its efforts during the three years under consideration are shown by the statistics presented for infant and maternal mortality. In the group of 8,185 cases in which prenatal nursing care was given during the years 1919-1921, the mortality rate for babies dying before the end of the first month was 25.9 per 1,000 births, as compared with a rate of 36.6 for the Borough of Manhattan during the same period. Of the 8,743 mothers under the care of the Maternity Center in these three years, the death rate was 40 per 10,000 births. As compared with this figure, the rate in 1920 for New York City as a whole was 50.9, and for the entire United States birth-registration area, 80 per 10,000 births, or twice as great.

Saving 100,000 Lives a Year: Much has been said about the lower death rate in the last fifty years. The weekly bulletin of the New York City Health Department recently published a table showing the average number of deaths from 1868 to 1872, at which time the city Health Department was established, and the number of deaths from the same causes in 1921. Calculated on the basis of the present population of New York, if the death rates of fifty years ago had prevailed last year, there would have been in New York City 2,013 deaths from typhoid fever. There were actually 123. Under the conditions of 1868, there would have been 3,163 deaths from smallpox. There were none. Vaccination was just as well known in 1868 as it is today. For over half a century the value of Jenner's discovery had been clearly demonstrated, yet smallpox was prevalent in New York City fifty years ago, whereas in 1921, there was not a single death. Why? Because before the city Health Department was created, it was nobody's business to prevent disease. With responsibility located and authority in the hands of a competent official, health regulations are enforced and sanitary conditions improved. Under the death rate of fifty years ago, there would have been 22,350 cases of tuberculosis. As a matter of fact, there were 5,143, a reduction of over 75 per cent. The total number of deaths from all causes in New York last year, if the death rate of fifty years ago had prevailed, would have been 161,150. The actual number of deaths were 64,257, a saving of 96,893, or nearly 100,000 lives saved in one city in one year, about as many lives as were sacrificed in the entire United States army during the eighteen months of the World War.—Health, March, 1923.

Lectures on a considerable number of health topics, including child welfare, have been prepared by the Bureau of Public Health Education of the New York City Department of Health, with lantern slides or motion pictures for use in illustration if desired. Lectures may be secured from the Bureau. During 1922 nearly 7,500 of these lectures were delivered. Through a special appropriation for the purpose it was possible to secure the services of a number of foreign language lectures who gave 500 lectures to groups of different nationalities.—Weekly Bulletin, Department of Health, New York City, April 14, 1923.

A campaign against rickets is being conducted by the Association for Improving the Condition of the Poor in the Mulberry District of New York City, an area with a population of 33,000, most of whom are Italians. An account of this work is given in the Survey, April 15, by John C. Gebhart, director of the department of social welfare of the Association.

The bureau of child hygiene of the New York City department of health will share in the education exhibit at the Grand Central Palace in connection with the celebration of the twenty-fifth anniversary of Greater New York. Its display will include a model of one of the city's baby health stations, and maternity and dental clinics. Doctors and nurses will be in attendance to give advice and information as to the work of the bureau. The acting director of the bureau reports that 60,000 babies are now enrolled in New York's 70 baby clinics, a number which is equal to two-fifths of all the babies born in New York in the course of a year.—New York Tribune, April 21, 1923.

"A Community Oral Hygiene Program": By John C. Gebhart, Director, Department of Social Welfare, New York Association for Improving the Condition of the Poor.

An account of the oral hygiene work done during the past three years by the New York Association for Improving the Condition of the Poor, in a congested Italian district in New York City where the association has been conducting an intensive health program. The author

gives details of the plan of work, the expense of the service, and the results.—Mother and Child, Washington, D. C., May, 1923.

OHIO

Several Hundred Chiropractors are Under Arrest in Ohio for the practice of medicine without a license. Several have been tried, convicted, fined five hundred dollars and are serving time in jail. The Universal Chiropractors' Association is asking for donations to a jail fund to pay fines and to pay for the time of the chiropractors who are in jail. The chiropractors who are wise will keep out of Ohio or else comply with the law which requires some knowledge of the elementary branches dealing with the human body in health and disease before attempting to practice upon the sick. Why not try Indiana or some of the other states where the chiropractors thrive and are unmolested. What is the use of attempting to get into a state where not wanted and where the sick are protected by reasonable laws.—Journal of the Indiana State Medical Association, April 15, 1923.

Medical Board Upheld: The right of the medical board to compel chiropractors to stop practicing unless they hold state licenses was affirmed by Common Pleas Judge Ahern, February 16, when he refused Herman J. Kroeger an injunction to restrain the state board from further interference with chiropractors. Reports state that Kroeger, a chiropractic patient, filed petition in the common pleas court to enjoin the state medical board from interfering with members of the chiropractic profession.—Journal of the American Medical Association, March 3, 1923.

"A Home-Made Health Show": An account of a health exhibition conducted in Bethel, Ohio, a small country town, through the co-operative effort of the local community.—(Survey, N. Y., May 15, 1923.)

FOREIGN

Dental Education: The Dental Board of the United Kingdom has published in the minutes of its last session the reports of the various committees which were appointed to examine into the matters on which it is intended to take action. The report of the Education Committee is of particular interest as the question of education, always a difficult one, is at present complicated by the transitional state in which the profession finds itself. The Board has taken the following steps to cope with the situation. Immediate needs have been met by means of grants and loans to students who, without such timely aid would not have been able to complete their curriculum and obtain their diplomas.

It will thus be seen that the Board has embarked on a useful program as regards dental education. It is clearly recognized that if the nation's teeth are to receive adequate attention the number of practicing dentists must be increased, and initial steps of a very definite and practical nature have been taken to deal with the needs of the immediate future. It now remains to be seen whether these steps meet the requirements of the present state of the profession. If they do not, it is a comforting thought that there is now in existence a body to which we can look for coordinated effort to anticipate and supply the needs of dentistry, and that matters, both educational and otherwise, can be with confidence left in its hands.—The Dental Surgeon, June 2, 1923.

Wages Board for Dental Mechanics in Victoria: The Government has now decided that a Wages Board be established for the metropolitan and some of the larger country areas. The Minister for Labour was petitioned by a number of mechanics, and objections were made by the dentists, lead by the State Dental Society of Victoria. The Minister, however, was satisfied with the case made out by the mechanics. The dentists have no objection to paying a fair wage for work done, but it is the imposition of trade union conditions to which the professional man objects.

Some of the conditions for which the mechanics are fighting are intolerable to most dentists, and there may be some difficulty for the Board to come to terms in regard to them. Efficient mechanics are not very plentiful, and undoubtedly the first result of a minimum wage will be the loss of position to many mechanics.

The profession will accept without complaint the establishment of a Board, and it is now of great importance that the profession select the best men to sit upon the Board. A lot will depend upon the firmness and tact of the dentists upon the Board as to what the conditions will be. We believe that there will be little difficulty for the representatives of the mechanics and the dentists to come to an agreement in regard to a fair wage, but as to the imposition of other and objec-

tionable conditions we anticipate considerable disagreement. For example, in the original demands of the mechanics, it was stated that no dentist should take an apprentice unless he employed a full-time mechanic, and, further, that no dentist should employ an improver unless he also employed a full time mechanic. Now, we believe that not 25 per cent of the dentists on the register would employ both an improver and a mechanic.

We think that some rule might be made with regard to the number of improvers or apprentices that a dentist could employ at the same time. For example, it might be said that a dentist should not employ an improver and take an apprentice unless he also employs a mechanic, nor take more than one apprentice at the same time, the idea, of course being, that a dentist should not carry on practice with cheap labour, discharging his assistants as they qualified for a higher wage and thus throwing on the market numbers of partly qualified mechanics.—Editorial, Australian Journal of Dentistry, April 1923.

Dental Hygiene in Australia: Dental abscesses and fistulae are present in from ten to thirty per cent of school children, and it is the sequelae of lack of masticating power and the swallowing of poisonous products which are responsible for impaired nutrition. Dr. Sutton points out that the permanent teeth must be cared for during their formative period before eruption. "We might almost say that once they are erupted it is too late." This is a point of view which has emerged from the study of the factors regulating nutrition and has immeasurably widened the scope of dental hygiene. Though the importance of ensuring a favourable environment for calcification of the teeth is generally recognized by the dentist, it cannot be too often emphasized, for as yet the physician hardly appreciates this aspect of nutrition. Dr. Sutton points the contrast between the frequency of hypoplasia in London children and its extreme rarity in Australia. On the relationship of diet to malformation of the jaws, Dr. Sutton holds decided views, and considers that rickets, adenoids and imperfect mastication of soft food form a triad of causes which leads to ill-formed palates. Dr. Sutton is the principal medical officer of the Department of Education, Sydney, and therefore speaks with especial authority on school dentistry. One of his aphorisms deserves to be widely quoted. "A child of 8 may be regarded as requiring just about three times more dental work than a child of 13 years."—British Dental Journal, June 1, 1923.

The German Society for Racial Hygiene, at a meeting on October 14-15, adopted certain fundamental principles bearing upon the general betterment of the German people.

They recommended, among other measures, sufficient financial aid to families with many children, legislation for the protection of the family, especially for the prevention of the early separation of the mother and child; employment by the government of trained men and women as advisers on marriage and family matters; energetic measures for the treatment of venereal diseases; keeping of health records for the whole population; and physical examinations at certain intervals. The society also urges that instruction in the hygiene of the race be introduced in the upper classes of the high schools and in colleges and universities, and that all candidates for teaching positions be instructed in special institutions in personal and racial hygiene.—Munchener Medizinische Wochenschrift, November 10, 1922.

The Danger of Loose Teeth in Operations on Tonsils and Adenoids: Mr. J. D. Mortimer, the anesthetist, contributes a sensible letter to the Lancet for May 5, in which he points out the danger of dislocating loose temporary teeth during the manipulations of the gag in the course of removal of tonsils and adenoids. He points out that there is a distinct risk that the tooth, if dislodged, may be lost in the blood and pass into the air passages. He remarks that though the risk of such an accident occurring during other operations on the mouth has received little attention. The point he makes is a sound one and will certainly receive the support of the dentist, though the latter, unless he sees the child previous to operation, cannot do anything. It should be remembered that the operation for removal of tonsils and adenoids is essentially an operation of childhood, and therefore is performed at a time when some of the temporary teeth may be extremely loose owing to normal absorption. Many surgeons are in the habit of sending a child to the dentist previous to operation on the throat so as to ensure the removal of dental sepsis.—British Dental Journal, May 15, 1923.

GENERAL

The Steps Already Taken in the Standardization of Public Health Training: Discussion by Dr. Ray Lyman Wilbur, Stanford University, California. "As I become associated more and more with educational institutions, I have become 'course shy.' Courses, courses—it seems to me, I live in an atmosphere of courses, and I am thoroughly tired and sick! When a man tells me he has given the same courses for twenty years, I say 'For goodness sake, why does not the Lord get busy!' When I talk of introducing more time into the curriculum for hygiene and public health, I fear it may take the form of some lecture courses that will be given in a stereotyped form year after year without any vitalizing effect. These courses can be given in a live way. We are training students so that they learn by doing, not by hearing, and public health instruction in a medical school must be organized on that basis. Students must go out and do the work. In the standardization of public health courses do not forget that we are trying to get over the standardization of medical courses. Give the individual institution and the individual man a chance to develop in their own way as much as you can, and also keep character and personality in the subject because, if you do, it will develop leadership just as it should in medical education."—Journal American Medical Association, April 28, 1923.

Medical Education: Preliminary Report of the Committee on Trained Nursing to the Council of Medical Education and Hospitals of the American Medical Association.

Dr. Robert W. Lovett, Boston:

"In 1880 there were fifteen training schools for nurses in the United States, with 323 pupils; in 1920 there were 1,755 schools, with 55,000 pupils. The number of schools increased 116 times over, and the number of pupils 170 times over between 1880 and 1920."—Journal American Medical Association, March 24, 1923.

Dental Advertising: Despite the fact that so much has been said and written upon the subject of dental advertising, "with a view to procuring patients," which methods are distinct breaches of the Board's Warning Notice, and of the further fact that this old and vexed question is now receiving the direct attention of the Discipline Committee, it is indeed surprising that so many dental practitioners should fail to conform honestly and honorably with that standard of conduct which should accord with the wishes of the Dental Board.—The Dental Surgeon, May 26, 1923.

Effect on the Teeth and Associated Parts of the Absence of Vitamins From the Diet: Up to the present there has not been a great deal published on experimental work in this direction, but in a paper read to the British Society for the study of Orthodontics in November, 1919, Mrs. May Mellanby, of the Physiological Laboratory, King's College for Women, London University, described a remarkable series of experiments carried out with puppies fed on a diet deficient in the fat-soluble A factor. It was shown that in puppies receiving a diet adequate in all respects except in fat-soluble A, extraordinary dental irregularities were produced:

(1) Poor and abnormal growth of the jaws and alveolar processes.
(2) Irregularly arranged teeth.
(3) Delay in the eruption of teeth.
(4) Delay and defects in the calcification of the enamel.
(5) Defective dentin.
(6) A decrease in the weight of the teeth compared to their size.
(7) The greater the rate of growth of the animal the greater jaw and teeth defects produced by absence of fat-soluable A factor.

If, on the other hand, the diet contained an adequate supply of fat-soluable A, the teeth, alveolar processes and jaws were normally calcified, and the teeth were regularly arranged.

In this connection Mrs. Mellanby says:

"Whether fat-soluble A works directly on the ameloblasts and other calcium depositing cells, or whether it has an indirect effect by stimulating some intermediate tissue, must for the time being remain simply a case of conjecture. There is, of course, evidence that certain endocrine organs, such as the pituitary, the parathyroid, and the thymus glands, are involved in calcium metabolism, but there is no experimental evidence that fat-soluble A has any specific effect on these bodies."—Pacific Dental Gazette, May 1923.

Campaign Against Malnutrition: The report of the Advisory Committee on Foods and Nutrition of the National Health Council, "The Campaign against Malnutrition," has just been issued by the United States Public Health Service as Public Health Bulletin No. 134. This report will be received with great interest on account of the fact that the

membership of the Committee includes some of the foremost nutrition workers in home economics. It represents a real consensus of opinion of the various groups composing the Committee and it is remarkable for its scope and comprehensiveness.

The report offers suggestions regarding the conduct of work for pre-school as well as for school children, and includes suggestions both for preventive and corrective nutrition work. The causes of malnutrition are discussed in the body of the report and in the appendix. The fact that malnutrition, if an entity, is not a clearly defined one, is emphasized and it is made clear that successful nutrition work involves the close co-operation of workers in many fields—physicians, dentists, nurses, teachers, social workers, nutrition specialists—as well as that of parents and children. Preventive work among school children, the report states, should be done by health education in all schools and including in such health education, nutrition teaching under the direction of a well-trained specialist.—American Journal of Public Health, June 1923.

Health Work for Children of Pre-School Age: A survey of the health work done throughout the country for the pre-school child is to be made by the Committee of the National Health Council on the Pre-school child. The committee will assemble all the material available on the subject from national organizations and government and state departments of health and education.—Monthly Digest, National Health Council, March, 1923.

Simple Goiter as a Preventable Disease: The studies of Marine and Kimball with regard to simple goiter, which were made possible under research grants from the American Medical Association, emphasize the prevalence of simple goiter and point to a method of prevention.

In the work of these two men, which has been referred to repeatedly in The Journal, nearly 10,000 girls in Akron, Ohio, were examined in the course of three years. In the first examination, 56 per cent were found to have goiters. The method of prevention was the administration of 3 grains of sodium iodid in the drinking water once a day for two weeks each spring and fall. Of those taking this prophylactic dose, no normal girl developed goiter, while 27.6 per cent of those not taking it, and who had been without goiter at the beginning developed either goiter or enlargment of the thyroid. The goiter disappeared in 60 per cent of those who had goiter at the beginning and took the prophylactic doses. Kimball says, in comment on these experiments, "From our experience in Akron we know that if a girl's thyroid is kept saturated with iodin during the years of adolescence, a goiter will not develop; and when we remember that the total storage capacity of the normal thyroid is approximately three-fourths of 1 grain of iodin, we appreciate that a small fraction of a grain of iodin at weekly intervals is sufficient to assure the full normal iodin content of the gland."

The findings of Marine and Kimball as to this method of prevention of goiter were forwarded to Switzerland in 1917, where they were employed with some slight modification as to the form of iodin. A report of the health commission of the canton of St. Gall shows that in January, 1918, the incidence of goiter among school children of that canton was 87.6 per cent, and in January, 1922, after iodin administration, 13.1 per cent.—Journal American Medical Association, June 9, 1923.

A Cheerful Prospect in the Field of Public Health Activities: From day to day, or even from year to year, the efforts of modern preventive medicine sometimes appear to have made little, if any, progress. We are reminded of the wealth of investigation devoted to the problems of tuberculosis, while the disease is still with us. All the many cancer research institutes throughout the world, so the pessimist argues, have not decreased the incidence of the malady. Yet there are so many instances of great progress that one can easily recover courage and strengthen conviction through the mere enumeration of some of them. Against smallpox and yellow fever, the great victory has been sustained. Our latest annual summary of typhoid death rates in the large cities of the United States shows a continuance of the typhoid decline which has been so striking a factor of the epidemiology of the disease for the last twelve years.

We have already remarked that the condition in the larger cities for the most part may now be regarded with pride instead of being pointed to with obloquy as awful examples. However forceful exhaustive statistics may be, they sometimes do not impress the individual so directly as the perhaps less accurate data derived from a smaller range that comes within his personal observation. As an

illustration of the changing health conditions in our American communities, we may cite an interesting personal experience recently recounted by a physician in one of the Southern states. Here is the striking testimony:

"During the five summer months of 1909, I saw 158 town patients. During the same period of 1922, I saw 202 town patients. Of the 158 patients seen in 1909, ninety-six had well-defined cases of malaria, with chill, fever, sweats, etc., fifteen had cholera infantum ileocolitis, or dysentery, with two deaths, and seven had typhoid fever, making a total of 108 out of 158 that should have been prevented. During the five summer months of 1922, I did not have in town a single typical case of malaria, typhoid fever, or cholera infantum. I had one atypical case of malaria that was most probably contracted out of town. I had only one case of ileocolitis that lasted over five days, and this was the only case of dysentery or infectious diarrhea in town this summer. There has not been a case of typhoid fever since February, 1919, malaria, typhoid and infantile diarrhea having about disappeared."

Nor does this tell the entire story. Hookworm disease has been controlled in that community, and people once "sallow, anemic, sick and thin," have become "healthy, prosperous and happy." Here is the record of a community in which someone, or rather, many who had both courage and the conviction of their hygienic precepts have labored, and not in vain. Who shall say that health is not a purchasable commodity? — Journal American Medical Association, April 7, 1923.

Army Dental Service Limited: The effect of Army elimination as applied to the commissioned personnel of the military establishment is made evident in the dental corps of the medical department. The War Department has directed hereafter dental service shall be practically restricted to members of the military personnel. While members of the families of officers and enlisted men have been granted full dental attendance, including crowns, bridges, and dentures (plates), it has been decided that hereafter treatment of this class of patients shall be limited to emergency work, for the relief of pain and such restorative measures as may be immediately necessary. This limitation on dental work is made imperative by the lack of dental surgeons in the Army. It has been found that the reduced number in the corps made it impossible to attend to the volume of professional work which the members of the branch were formerly able to perform. The dental corps, by virtue of the elimination legislation of last June, lost 76 officers, upon whom it was necessary to depend for the work devolving on the corps. While the Army, as a whole, lost 1,000 officers of the total commissioned strength of 13,000, or about 8 per cent, the dental corps lost 76 officers out of a total of 235, or a sacrifice of 32 per cent. In this connection, it is interesting to observe that the commanding general of the 9th corps area has addressed a letter to the commanding officers of the posts and stations within that command stating that the number of dental surgeons recently allotted to that area is so small that it is necessary for them to devote all of their time to professional work, and they cannot be detailed to any duty which will interfere with the completion of necessary dental work. Whenever the full time of the dental officer is not occupied in the performance of duty in connection with his specialty, that fact must be reported without delay to the corps area headquarters.—Army & Navy Register, March 24, 1923.

Ten years ago, the average length of life was 46½ years. That is, a child at birth might be expected to live 46½ years. On account of years of education, improved sanitary methods in general use, improved living conditions, prevention of epidemic diseases and improved methods of treating sickness, the average span of life was extended, during the last decade, to 55 years. In a recent bulletin issued by the Metropolitan Life Insurance Company, Dr. Louis I. Dublin, statistician of the company, states that at least ten years could still be added to the expectation of life for the average person in the United States, if the low rates already prevailing in certain parts of the country were to apply generally to the whole population. The two most important unsolved problems of children's illnesses are scarlet fever and measles and it is reasonable to expect that the next few years will see these problems of child mortality greatly clarified and something in the way of real protection against them evolved. Without doubt the mortality rate for the ages 5 to 10 years will continue to decrease through improved understanding of children's diseases and their treatment. In the span of ages from 10 to 60 years, it

is to be assumed that in the near future the mortality rate will be reduced approximately one-half in comparison with the 1910 rate. The number of deaths from tuberculosis is steadily decreasing; the accident death rate is being greatly cut down each year and through the influence of periodic medical examinations and other so-called "life extension" methods, there is a possible decrease in the number of deaths from chronic diseases and diseases of the heart, blood vessels and kidneys.

And so, Dr. Dublin concludes that it is possible to attain, in the next ten years, an average life span of 65 years as the result of putting into general practice what is known today of the causes and prevention of diseases.—Health, March, 1923.

The Power of Right Thinking (?): "Many lives have been lost through procrastination with ineffective mental therapeutics when prompt and radical measures were needed. On the whole, however, Coueism and all the other mind-cure cults are doing good by showing us the importance of a right mental attitude toward disease. The sick man must not supinely lie down and permit the monster disease to place its foot upon his neck and crush him. He must rise up and assert his supremacy as the masterpiece of creation, and his right to be well by right living. He must turn his eyes away from the hobgoblins of disease, and cultivate health through right living as well as by right eating and by exemplary conduct in all that pertains to his well-being—physical, mental and moral."—Good Health Magazine.

How About Your Machinery? From the standpoint of physical fitness, it is an unfortunate fact that our clothes are designed to conceal our physical defects. Whether consciously or unconsciously, designers of costumes for centuries have been exercising their ingenuity to devise clothing that shall make the fat and the lean, the stoop-shouldered and the knock-kneed, look like normal people. It would be better if our clothing made our defects stand out in bold relief; then pride would cause most of us to set about correcting these defects instead of being contented to hide them. You have but to visit a bathing beach, where people can be seen without the charitable aids of the tailor and the dressmaker, to realize how sorry a physical spectacle is furnished by the generality of humankind. Secretary of War Weeks states examinations have shown that fifty per cent of our population are physically unfit.

What shape is your internal machinery in? How's your power? Beneath the husks of clothing that conceal you, what is the condition of the real you? When the doctor peers beneath the skin, when he subjects you to the tests of his stethoscope and his blood-pressure apparatus, what will he find?

It isn't the paint on the outside that determines the efficiency and the endurance of the machine. It isn't your appearance when you are "all dressed up" that indicates your physical fitness to cope with the tasks and responsibilities of life. Do you belong to the physically unfit half of our population?

"The great prizes of life ever fall to the robust, the stalwart, the strong, not to a huge muscle or powerful frame, necessarily. As a rule, physical vigor is the condition of a great career. The weak, chestless, calfless, forceless, languid, hesitating, vacillating young man may manage to live a respectable sort of life; he seldom climbs, is not a leader, rarely gets at the head of anything important."—Orison Sweet Marden.—The Hygienist, May, 1923.

Diabetes Mortality in 1922: The diabetes death rate increased ten per cent during 1922. The rate in that year was 17.0 per 100,000, the highest figure on record in twelve years. During that period, diabetes mortality showed a rise from a minimum of 13.3 in 1911 to a first maximum of 15.9 in 1916, and then declined to a second minimum of 13.4 in 1919. Since that year the rate has risen rapidly to the figure recorded in 1922. There seems to be a rough correspondence between rises in the per capita figure for raw sugar consumed in the United States and the death rate from diabetes, especially during the last four years. It may be possible, also, that the increased consumption of beverages containing high percentages of unfermented malt sugar, and of confections, may be contributing factors to the recent increase of the diabetes death rate.—Metropolitan Life Insurance Company, Statistical Bulletin, January, 1923.

Our Aim: When communities appreciate that it is cheaper and better to spend money in preventing disease than in curing it and that to develop personal health and health habits is true patriotism, we shall accomplish our end.—Mother and Child, May, 1923.

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Child Health Association, October 15, 16 and 17, 1923, Detroit, Michigan.

American College of Surgeons, October 22 to 26, 1923, Congress Hotel, Chicago, Illinois.

Congress of Anesthetists, October 22 to 24, 1923, Auditorium Hotel, Chicago, Illinois.

STATE SOCIETIES

National Capital, first Tuesday of every month.

October

Northern Indiana, at Goshen (15, 16).

November

Arizona, at Chandler (2, 3).
Florida, at Jacksonville (8, 9, 10).
Georgia, at Athens (7, 8, 9).

January (1924)

Chicago Dental Society, at Chicago (17, 18, 19).

May (1924)

Pennsylvania, at Pittsburgh (13, 14, 15).

MEETINGS OF STATE BOARD OF DENTAL EXAMINERS

Colorado, at Denver, first Tuesday of December. Secretary, Wm. H. Flint, Littleton, Colorado.

Michigan, at Dental College, Ann Arbor, November 19 to 24, 1923. Secretary, B. S. Southerland, 401 Ward Bldg., Owosso, Michigan.

NORTHERN OHIO DENTAL ASSOCIATION

An executive session of the Northern Ohio Dental Association was held on June 4, 1923, at Cleveland, the regular general sessions having been canceled in favor of the annual meeting of the American Dental Association booked for Cleveland, September 10-14, 1923.

The present officers of the Northern Ohio Dental Association were re-elected for 1924, and are as follows: J. V. Gentilly, President, Cleveland, Ohio; J. W. Hartshorn, President-elect, Toledo, Ohio; E. S. Braithwaite, Secretary, Willard, Ohio; B. D. Phillips, Treasurer, Cleveland, Ohio.

The Executive Committee are: H. R. C. Wilson, Chairman, Cleveland, Ohio; L. E. Phelps, Publicity, Toledo, Ohio; Thos. J. Hill, Exhibits, Cleveland, Ohio.

E. S. BRAITHWAITE, *Secretary.*

THE ST. LOUIS STUDY CLUB

The St. Louis Study Club of Dentistry announces the opening of its 1923-24 term in October. Classes will be held in: Removable bridgework; fixed crown and bridgework; porcelain technic; inlays and cavity preparation; full dentures; root-canal technic; periodontia and oral diagnosis; conduction and local anesthesia; radiodontia; and pathology and bacteriology.

Those interested in Study Club Work, either enrolling in this one, (if close to St. Louis), or the organization and conduct of a Study Club in their own community, should address the Registrar.

EDGAR M. CARSON,
1119 Union Boulevard,
St. Louis, Missouri.

MICHIGAN STATE BOARD OF DENTAL EXAMINERS

The next meeting of the Michigan Dental Board will be held the week of November 19 to 24, 1923 at Dental College, Ann Arbor,

Michigan. Those desiring to take this examination must have applications and credentials in thirty days previous to said meeting.

B. S. SOUTHERLAND, *Secretary.*
401 Ward Bldg., Owosso, Michigan.

NEW BOOKS RECEIVED FOR THE LIBRARY OF THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

The Journal of the American Dental Association promptly acknowledges here the receipt of new publications. Books selected from those named on this list are reviewed below. Reviews are matter-of-fact statements of the nature and contents of the publications referred to and are intended *solely to guide possible purchasers.*

Physiotherapy Technic. A manual of applied physics by C. M. Sampson, M.D., New York City. Eighty-five illustrations, 443 p. C. V. Mosby & Co., St. Louis, Mo. Price $6.50.

Surgery for Dental Students. A text book by G. Percival Mills, M.B., B.S. (Lond.), F.R.C.S., and Humphrey Humphresy, M.C., M.B., Ch.B., M.D.S. (Birm.), L.D.S. (Eng.) Third edition, illustrated, 344 p. Longmans, Green & Co., New York, $5.00.

Dental Anatomy and Physiology. A text book by John Humphreys, M.D.S., (Birm.), F.S.A., F.G.S., F.L.S., and A. W. Wellings, M.D.S., (Birm.), L.D.S., (Edin.), Birmingham, England. Illustrated, 323 p. Longmans, Green & Co., New York, $5.20.

Dental Surgery and Pathology. By J. F. Colyer, K.B.E., F.R.C.S., L.D.S., England. Fifth edition, with 6 plates and 951 illustrations, 931 p., Longmans, Green & Co., New York, $10.50 net.

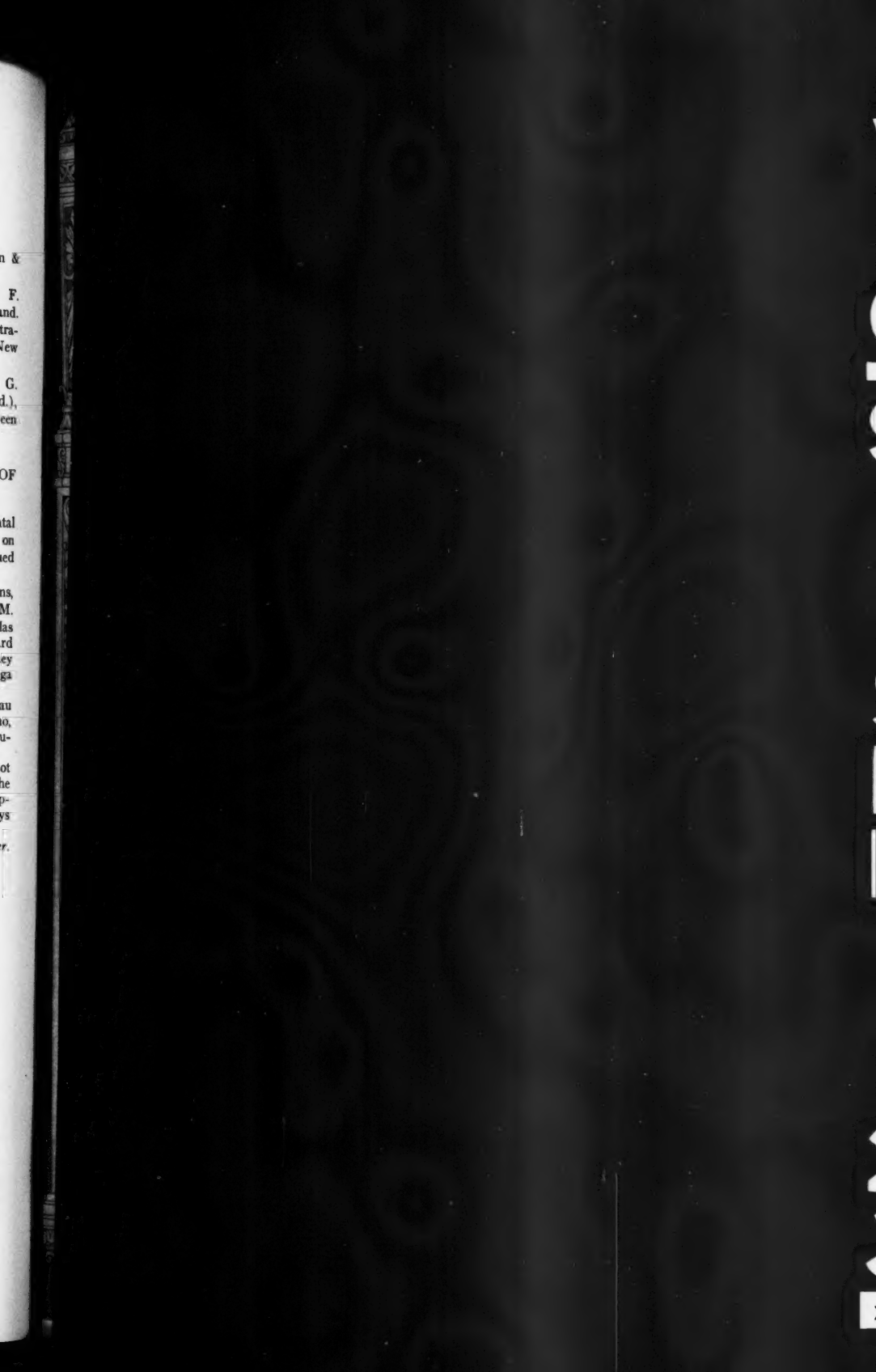
Physiology for Dental Students. By A. G. Curzon-Miller, B.Sc., L.M.S.S.A. (Lond.), F.C.S., illustrated. 203 p. Longmans, Green & Co., New York, $3.75.

STATE OF IDAHO DEPARTMENT OF LAW ENFORCEMENT

The following applicants passed the dental examination that was held in this office on July 10, 1923, and certificates were issued August first:

Rowland H. Campbell, Phillip Smith Evans, Wm. F. Mart, Frank Carl Scott, Wm. M. Webb, Beverly Clay Daniel, Vaughn Douglas Lyons, Eugene L. Bergan, Harold Howard Heer, George W. McKeever, Ezra Finney Bicknell, Siguard Wilhelm Siljan, and Olga R. B. Siljan.

Dental examinations are held in the Bureau of License, Capitol Building, Boise, Idaho, twice a year on the second Tuesday in January and July.

Frequently several of the applicants do not file their applications a day or so prior to the meeting of the Board, but hereafter all applications must be filed at least fifteen days prior to the day of examination.

F. A. JETER, *Commissioner.*